TETRA TECH, INC.

TECHNICAL MEMORANDUM

Basewide Groundwater Monitoring Program Report
Winter 2006 (Q1)
Installation Restoration Program Site 2
Vandenberg Air Force Base, California

09 June 2006

Prepared by:
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1.0 INTRODUCTION

This report documents the activities and results of the winter 2006 groundwater monitoring at Installation Restoration Program Site 2 (Old Base Service Station, or OBSS), Operable Unit 6, Vandenberg Air Force Base (AFB), Santa Barbara County, California. Samples were collected at Site 2 by Tetra Tech, Inc. (Tetra Tech) during February 2006. The location of Site 2 is shown on Figure 1.

The groundwater monitoring is being completed in accordance with the Basewide Groundwater Monitoring Program (BGMP) Work Plan (Tetra Tech 2000a), the BGMP Health and Safety Plan Addendum (Tetra Tech 2000b), the Basewide Sampling and Analysis Plan (Tetra Tech 2003), the BGMP Quality Assurance Project Plan (QAPP) Addendum (Tetra Tech 2004a), the Vandenberg AFB Hazardous Waste Management Plan (U.S. Air Force 2002), and the Waste Management Plan Addendum (Tetra Tech 2005). Regulatory oversight of the work is being performed by the California Department of Toxic Substances Control (DTSC) and Regional Water Quality Control Board—Central Coast Region (RWQCB).

Site background information is summarized in Section 2.0. The scope of work and methodology for groundwater monitoring are presented in Section 3.0. The results of the quarterly monitoring are presented in Section 4.0. Quality Assurance/Quality Control is discussed in Section 5.0. Recommendations for future sampling are presented in Section 6.0.

2.0 BACKGROUND

2.1 SITE DESCRIPTION AND HISTORY

Installation Restoration Program Site 2 is located in the main cantonment area, north of the intersection of Wyoming and Summersil Avenues. In early 2000, a Tee-Ball field was constructed over most of the Site (Figure 1). The Child Development Center playground is located to the northeast.

The OBSS had a service station building and three pump islands on a 200-foot by 200-foot asphalt lot. The site had four 10,000-gallon gasoline underground storage tanks (USTs), a 500-gallon aboveground waste oil tank, and an oil/water separator (OWS). The OBSS dispensed leaded and unleaded gasoline from 1941 until 1981.

All structures, tanks, and piping associated with the OBSS were removed between 1981 and 1998 (HydroGeoLogic [HGL] 2001). All four gasoline USTs, which were located at the northwest corner of the site, were removed in 1981. In 1992, Jacobs Engineering Group, Inc. (JEG) removed the concrete OWS and fuel distribution piping (HGL 2001). In 1998, the 500-gallon waste oil tank was removed. During the removal of the OBSS building, the pump islands, and the pavement in 1998, monitoring wells 2-MW-2, and OS-MW-4 were reportedly destroyed and wells OS-MW-3A and OS-MW-2 were damaged (HGL 2001).

In 1999, IT Corporation, Inc. (IT) began investigations at the site. In September 1999, IT conducted a shallow soil investigation. HGL continued the investigation and, in November 1999, removed 170 cubic yards of soil below the former location of the two easternmost pump islands (along the southern portion of the site) (HGL 2001). The Tee-Ball field was built several months after completion of the excavation activities (Martinez 2001).

During the construction of the Tee-Ball field and the realignment of Wyoming Avenue and Utah Avenue, monitoring wells 2-MW-5 through 2-MW-9, OS-MW-3A, and OS-MW-4 were buried under fill material. Wells 2-MW-5 through 2-MW-9 were subsequently found and are not damaged. In September 2000,

Tetra Tech was requested to determine the condition of wells OS-MW-2, OS-MW-3A, and OS-MW-4. Well OS-MW-2 was found and was determined to be undamaged. Tetra Tech was unable to find monitoring wells OS-MW-3A and OS-MW-4 due to the amount of fill material covering them. The condition of these wells is unknown; however, it appears likely they have been destroyed. In a letter dated 6 February 2001 the Air Force recommended no further search for these wells. The RWQCB concurred with this recommendation in a letter dated 15 March 2001.

In February 2002, Tetra Tech installed a remote sampling system for wells 2-MW-5, 2-MW-7, 2-MW-8, and 2-MW-9 at Site 2. The system was designed to facilitate quarterly sampling of these wells, which are buried under the Tee-Ball field, without delaying use of the Tee-Ball field or impacting the condition of the grass on the field or surrounding grounds.

The remote sampling system was installed with watertight well caps and continuous tubing. The static water levels of these wells are measured using a pressure transducer that calculates the height of a water column above an open-ended tube suspended in the casing. The pressure transducer is zeroed to ambient pressure before the first reading is taken. Since the wells are sealed to prevent surface water intrusion, the air inside the casings is no longer at ambient pressure. For this reason the static water levels measured by the remote sampling system may be different from what is measured by the pressure transducer.

2.2 HYDROGEOLOGY

Site 2 is located on Burton Mesa, where groundwater typically occurs unpredictably in small lenses perched on low-permeability layers. At Site 2, groundwater is encountered in apparently discontinuous perched lenses in the unconsolidated sediments overlying Monterey Formation bedrock and, more importantly, in fractured cherts and porcelanites (HGL 2001). Groundwater occurring in this fractured zone within the Monterey Formation represents the groundwater monitoring network sampled under the BGMP at Site 2.

Groundwater depths range from 14 to 31 feet below ground surface (bgs). However, groundwater was encountered during drilling at approximately 10 feet below the static level measured in the monitoring wells (HGL 2001).

Groundwater levels measured in February 2006 indicate the groundwater elevation ranged from approximately 450 to 453 feet above mean sea level (msl) (Table 1). Based on data from this quarter, the interpreted direction of groundwater flow at Site 2 was to the northwest with an average hydraulic gradient of 0.01 feet per foot (Figure 1).

Monitoring wells at Site 2 are screened between 411.3 and 452.5 feet above msl (Tetra Tech 2004b). According to the Supplemental RI Report completed by HGL, the deep groundwater zone occurs below lenses of relatively impermeable material. The boring logs of monitoring wells sampled as part of the BGMP show groundwater was encountered at depths below laminated mudstone, silty clay, or clay layers (HGL 2001). Therefore, the groundwater sampled as part of the BGMP is from the deep groundwater zone.

3.0 SCOPE OF WORK

The work performed during winter 2006 at Site 2 included measuring groundwater elevations, collecting groundwater samples for laboratory analysis, and preparing this report.

3.1 GROUNDWATER MONITORING METHODOLOGY

Eleven wells were sampled at Site 2 during winter 2006. Dedicated MicroPurge pumps were used for purging and sampling groundwater from all Site 2 wells. Sampling was conducted in accordance with the documents cited in Section 1.0. Measured groundwater elevations are presented in Table 1, and groundwater contours are illustrated on Figure 1. Purge records are provided in Appendix A.

In general, wells were purged until a minimum of one pump and tubing volume of water was removed and water quality parameters had stabilized. Criteria for determining stabilization are three successive measurements of temperature within ±1 degree Celsius, pH within ±0.1, conductivity within ±5 percent, and a turbidity reading of less than 5 nephelometric turbidity units (NTUs). In cases where stability or a turbidity reading of less than 5 NTUs was not obtained, samples were collected after purging a minimum of five pump and tubing volumes of water.

3.1.1 MicroPurge Groundwater Sampling

MicroPurge sampling was conducted at all monitoring wells sampled at Site 2 during winter 2006. The pumping rates were calibrated for each well prior to purging to maintain a static water level (i.e., minimal drawdown). Due to high turbidity, wells 2-MW-1, 2-MW-10, 2-MW-12, OS-MW-1 were sampled after purging five pump and tubing volumes of water. Well OS-MW-2 was sampled after purging five pump and tubing volumes of water due to unstable conductivity readings.

4.0 RESULTS

Temperature, conductivity, pH, and turbidity were measured during purging and sampling. Field parameter readings measured immediately prior to sampling are presented in Table 2. Fixed laboratory analyses were performed by EMAX Laboratories, Inc. in Torrance, California. Samples were analyzed according to the work plan (Tetra Tech 2000a) for dissolved metals by U.S. Environmental Protection Agency (EPA) method SW6010B, total petroleum hydrocarbons as gasoline (TPHg) by EPA method SW8015B, volatile organic compounds (VOCs) by EPA method SW8260B, semivolatile organic compounds (SVOCs) by EPA method SW8270C, and polynuclear aromatic hydrocarbons (PAHs) by EPA method SW8270C with selected ion monitoring (SIM). Laboratory analyses and data validation were conducted according to the QAPP Addendum (Tetra Tech 2004a). Data validation was performed on 100 percent of the analytical data. Analytical results are presented in Tables 3 through 5 and on Figure 2. A historical summary of key contaminants of concern (COCs) is presented in Table 6 and on Figures 3A and 3B. Figure 3A contains historical data for key COCs from December 1999 through fall 2003, and Figure 3B contains historical data for key COCs from winter 2004 to present. Hydrographs showing historical benzene concentrations in groundwater from well 2-MW-7 and benzene and naphthalene concentrations in groundwater from well 2-MW-8 are presented on Figure 4. Chain-of-custody records are provided in Appendix B.

4.1 METALS

Groundwater samples collected from all wells sampled at Site 2 this quarter were analyzed for dissolved metals. Dissolved metal concentrations were compared to the 95th percentile background threshold values (BTVs) for groundwater (JEG 1994) and primary maximum contaminant levels (MCLs).

Aluminum was detected above the BTV of 1,200 micrograms per liter (µg/L) and the MCL of 1,000 µg/L in groundwater from well 2-MW-8 at a concentration of 5,750 µg/L (Table 3 and Figure 2).

Beryllium was detected above the BTV of 0.3 µg/L and the primary MCL of 4 µg/L in groundwater from well 2-MW-8 at a concentration of 7.86 µg/L. In the groundwater sample from well 2-MW-7, beryllium was detected above the BTV at a concentration of 1.62 µg/L.

Cadmium was detected above the BTV and primary MCL of 5 µg/L in groundwater from wells 2-MW-1, 2-MW-7 through 2-MW-10 and OS-MW-1 at concentrations ranging from 7.93 to 84.8 µg/L.

Nickel was detected above the MCL of 100 µg/L in groundwater from seven wells at concentrations ranging from 141 to 229 µg/L (Table 3). These concentrations are below the BTV of 490 µg/L.

Selenium was detected above the BTV of 3 µg/L in groundwater from wells 2-MW-1 (parent and duplicate sample), 2-MW-5, 2-MW-7 through 2-MW-11, OS-MW-1, and OS-MW-2 (parent and duplicate sample) at concentrations ranging from 6.99 and 46.8 µg/L, respectively.

In addition, arsenic, barium, calcium, cobalt, magnesium, molybdenum, potassium, sodium, and zinc were detected at concentrations above their respective BTVs in one or more Site 2 wells. The key COC metals concentrations detected during winter 2006 were within the ranges of those previously detected (Table 6 and Figures 3A and 3B).

4.2 TOTAL PETROLEUM HYDROCARBONS

Groundwater samples collected from wells 2-MW-7 through 2-MW-9, OS-MW-1, and OS-MW-2 were analyzed for TPHg. TPHg were detected in groundwater from wells 2-MW-7 and 2-MW-8 at concentrations of 0.29 and 2.8 milligrams per liter (mg/L), respectively (Table 5). The TPHg concentrations detected during winter 2006 were within the range of those previously detected. The TPHg concentrations detected in groundwater from well 2-MW-8 have been above the Leaking Underground Fuel Tank action level for TPH in groundwater of 1 mg/L every sampling round since the MicroPurge pumps were installed in winter 2002 (Table 6 and Figures 3A and 3B).

4.3 VOLATILE ORGANIC COMPOUNDS

Groundwater samples collected from wells 2-MW-7 through 2-MW-9, OS-MW-1, and OS-MW-2 were analyzed for VOCs. Benzene was detected above the primary MCL of 1 µg/L in groundwater from wells 2-MW-7 and 2-MW-8 at concentrations of 1.7 and 67 µg/L, respectively (Table 4).

Concentrations of benzene, ethylbenzene, toluene, and xylenes (BTEX) detected in groundwater from well 2-MW-8 increased significantly between fall 2001 and winter 2002, which coincides with the installation of the MicroPurge pump during winter 2002 (Table 6 and Figures 3A and 3B). Between winter 2002 and spring 2002, concentrations of these VOCs decreased to levels approximately two times higher than the concentrations detected prior to the installation of the MicroPurge systems. Concentrations of benzene in groundwater from wells 2-MW-7 and 2-MW-8 have been generally increasing (Figure 4). All key VOC concentrations in groundwater from well 2-MW-8 increased between fall 2005 and winter 2006. All of the benzene concentrations detected in groundwater from well 2-MW-8 since December 1999 have been above the MCL of 1 µg/L. There is no apparent correlation between contaminant concentration and groundwater elevation in wells 2-MW-7 and 2-MW-8. Benzene has not been detected in groundwater from downgradient well 2-MW-9 since December 1999, indicating the VOC plume in groundwater is not moving downgradient. During the remedial investigation performed by HGL, BTEX were detected in deep and shallow soil samples collected near well 2-MW-8, and 170 cubic yards of soil were removed from the site in November 1999 (HGL 2001).

4.4 SEMIVOLATILE ORGANIC COMPOUNDS AND POLYNUCLEAR AROMATIC HYDROCARBONS

Groundwater samples collected from wells 2-MW-1, 2-MW-3, 2-MW-5, 2-MW-7 through 2-MW-9, OS-MW-1, and OS-MW-2 were analyzed for SVOCs. Groundwater samples from wells 2-MW-8 and OS-MW-2 were also analyzed for PAHs. Naphthalene was detected in groundwater from well 2-MW-8 at a concentration of 23 µg/L using EPA method SW8270C for SVOCs, and 21 µg/L using EPA method SW8270C with SIM for PAHs (Table 5). The compound 2-methylnaphthalene was detected in groundwater from the same well at a concentration of 27 µg/L using EPA method SW8270C.

Naphthalene has been detected in groundwater collected from well 2-MW-8 since December 1999 at concentrations ranging from 1.07 µg/L (December 1999) to 28.8 µg/L (winter 2004) (Table 6). Naphthalene has been detected at concentrations above the California Department of Health Services (DHS) notification level (NL) of 17 µg/L during eight sampling events since December 1999. The compound 2-methylnaphthalene has been detected in groundwater from well 2-MW-8 since summer 2001 at concentrations ranging from 5.7 µg/L (fall 2001) to 38.2 µg/L (winter 2004) (Appendix C: Table C-1). Concentrations of both compounds generally show an increasing trend marked by a significant decrease in concentrations between winter 2004 and spring 2005 (Figure 4 and Appendix C: Figure C-1).

5.0 QUALITY ASSURANCE/QUALITY CONTROL

All of the analytical data presented in this report have been validated according to the QAPP Addendum (Tetra Tech 2004a). The data validation process includes review of sample preservation, temperature, and hold times; detection and quantitation limits; instrument calibration; and equipment blank, trip blank, method blank, laboratory control sample, and matrix spike/matrix spike duplicate. Data validation qualifiers and comments are provided on the data tables to indicate the results of the data validation and to quantitatively indicate the usability of the data. In addition, field sampling records are reviewed to assess the potential for any field conditions to adversely impact the data quality.

There were no significant quality assurance/quality control discrepancies with the data presented in this report. The data quality objectives for the winter 2006 sampling at Site 2 were achieved.

6.0 RECOMMENDATIONS

In the fall 2005 Groundwater Monitoring Report for Site 2, Tetra Tech and the Air Force made the following recommendations:

1. Reduce the analyte list for dissolved metals at Site 2 to key BGMP COCs aluminum, beryllium, cadmium, selenium, and thallium. The RWQCB and DTSC commented that sodium concentrations reported in the fall 2005 report are significantly elevated. In addition, the RWQCB and DTSC objected to reducing the analyte list based exclusively on risk evaluations. Therefore, the analyte list will not be reduced at this time.

2. Reduce the sampling frequency for dissolved metals from semiannually to annually during summer quarters for wells 2-MW-3, 2-MW-6, 2-MW-7, 2-MW-9, OS-MW-1, and OS-MW-2 and from quarterly to annually during winter quarters for wells 2-MW-8 and 2-MW-11. The RWQCB and DTSC had no objection to reducing the sampling frequency and requested that the Air Force sample all wells proposed for annual metals analysis during the same sampling event. Therefore wells 2-MW-3, 2-MW-6, 2-MW-7, 2-MW-8, 2-MW-9, 2-MW-11, OS-MW-1, and OS-MW-2 will be sampled annually for dissolved metals during the winter sampling events.

3. Reduce the sampling frequency for TPHg from semiannually to annually during winter sampling events for well OS-MW-2. The RWQCB and DTSC concurred with this recommendation.

4. Reduce the sampling frequency for SVOCs from semiannually to annually during winter sampling events for well 2-MW-7. The RWQCB and DTSC concurred with this recommendation.

Recommendations for the winter 2006 Groundwater Monitoring Report are presented below:

1. Tetra Tech and the Air Force recommend removing SVOC analysis for wells 2-MW-1, 2-MW-3, 2-MW-5, 2-MW-7, OS-MW-1, and OS-MW-2. The SVOCs naphthalene, 2-methylnaphthalene, and indeno(1,2,3-cd)pyrene have not been detected in groundwater from these wells since BGMP sampling of these wells began in spring 2001, with the exception of indeno(1,2,3-cd)pyrene detected in groundwater from well OS-MW-2 at a concentration of 4.27 µg/L during winter 2004 (Table 6 and Appendix C: Table C-1). The SVOC bis (2-ethylhexyl)phthalate has been detected in groundwater from Site 2 wells; however, it is a common laboratory contaminant and detections are believed to have been a result of laboratory contamination and not present in site groundwater. Wells 2-MW-1, 2-MW-3, 2-MW-5, 2-MW-7, and OS-MW-2 are crossgradient from the SVOC plume near well 2-MW-8 and have not been historically in the plume. Well OS-MW-1 is downgradient from the SVOC plume near well 2-MW-8 and has not been historically in the SVOC plume. Well 2-MW-9, the closest well downgradient from well 2-MW-8, will be retained as the sentry well to monitoring for possible migration of SVOCs in groundwater near well 2-MW-8 (Figure 1).

2. Tetra Tech and the Air Force recommend reducing SVOC analysis for well 2-MW-8, from quarterly to semiannually during winter and summer quarters. The highest historical concentrations of SVOCs were most often detected during winter quarters (Figure 4). Naphthalene has been detected in groundwater from well 2-MW-8 at concentrations that are often above the DHS NL of 17 µg/L and historical 2-methylnaphthalene concentrations from this well range from 5.7 to 38.2 µg/L (Table 6 and Appendix C: Table C-1). Concentrations of naphthalene and 2-methylnaphthalene have generally been stable (Figure 4 and Appendix C: Figure C-1.

3. Tetra Tech and the Air Force recommend removing PAH analysis for wells 2-MW-8 and OS-MW-2. During the last 4 quarters, naphthalene has been detected by the PAHs analysis using EPA method SW8270C SIM at concentrations similar to those detected by the SVOC analysis using EPA method SW8270C (Appendix C; Table C-2). Indeno(1,2,3-cd)pyrene is a target PAH that was detected once in groundwater from well OS-MW-2 using the SVOC analysis by EPA method SW8270C and once in groundwater from well 2-MW-8 using the PAHs analysis by EPA method SW8270C SIM. This compound has not been detected using either method in either well during the past 4 quarters (Appendix C; Table C-1). The SVOC analysis by EPA method SW8270C is necessary and PAH analysis by EPA method SW8270C SIM is redundant for three reasons: 1) 2-methylnaphthalene is an analyte under the SVOC analysis by EPA method SW8270C that has been detected at concentrations up to 38.2 µg/L and not an analyte under the PAHs analysis using EPA method SW8270C SIM, 2) since indeno(1,2,3-cd)pyrene has not been consistently detected in groundwater from site wells using PAH analysis, it is no longer warranted, and 3) naphthalene concentrations detected under the SVOC analysis by EPA method SW8270C and the PAH analysis using EPA method SW8270C SIM are similar.

4. Tetra Tech and the Air Force recommend removing TPHg analysis for wells OS-MW-1 and OS-MW-2. TPHg have not been detected in groundwater from wells OS-MW-1 and OS-MW-2

during the BGMP with the exception of low concentrations (0.02 and 0.03 mg/L) detected in samples collected during winter 2004 (Table 6); these results were qualified for blank contamination and believed to not be present in the groundwater from these wells. Well OS-MW-1 is downgradient from well 2-MW-8. Well 2-MW-8 is the only well with TPHg concentrations above the LUFT action level for TPH in groundwater of 1 mg/L. Well 2-MW-9, the closest well downgradient from well 2-MW-8, will continue to be sampled annually during winter quarters and will serve as the sentry well to monitor for possible migration of TPHg in groundwater near well 2-MW-8 (Figure 1). Well OS-MW-2 is crossgradient from the TPHg plume near well 2-MW-8.

These recommendations were developed in accordance with the Air Force Center for Environmental Excellence Long-Term Monitoring Optimization Guide (U.S. Air Force 1997) and the decision tree developed by Tetra Tech for the BGMP at Vandenberg AFB (Tetra Tech 2002).

The spring 2006 sampling will be conducted according to the work plan (Tetra Tech 2000a).

7.0 REFERENCES

HydroGeoLogic, Inc. (HGL)

2001 *Supplemental Remedial Investigation Report, Site 2-Old Base Service Station, Vandenberg AFB, California. Final.* Prepared for the Air Force Center for Environmental Excellence. December.

Jacobs Engineering Group, Inc. (JEG)

1994 *Basewide Background Sampling Report. Final.* Prepared for the Air Force Center for Environmental Excellence. June.

Martinez, Pablo

2001 30 CES/CEVR Installation Restoration Program Geologist, personal communication, Vandenberg AFB.

Tetra Tech, Inc. (Tetra Tech)

2000a *Basewide Groundwater Monitoring Program Work Plan.* Prepared for 30 CES/CEV, Installation Restoration Program, Vandenberg Air Force Base, California, and Headquarters Air Force Space Command, Peterson Air Force Base, Colorado. December.

Tetra Tech, Inc. (Tetra Tech)

2000b *Basewide Groundwater Monitoring Program Health and Safety Plan Addendum.* Prepared for 30 CES/CEV, Installation Restoration Program, Vandenberg Air Force Base, California, and Headquarters Air Force Space Command, Peterson Air Force Base, Colorado. December.

Tetra Tech, Inc. (Tetra Tech)

2002 *Basewide Groundwater Monitoring Program Interpretation, Visualization, and Optimization, Vandenberg Air Force Base Installation Restoration Program.* Presentation prepared for 30 CES/CEVR Installation Restoration Program, Vandenberg Air Force Base, California. March.

Tetra Tech, Inc. (Tetra Tech)

2003 *Final Basewide Sampling and Analysis Plan.* Prepared for 30 CES/CEV Installation Restoration Program, Vandenberg Air Force Base, California, and Headquarters Air Force Space Command, Peterson Air Force Base, Colorado. September.

Tetra Tech, Inc. (Tetra Tech)

2004a *Basewide Groundwater Monitoring Program Quality Assurance Project Plan Addendum. Final.* Prepared for Department of the Air Force 30 CES/CEVR, 806 13th Street, Suite 116, Vandenberg Air Force Base, California, and Department of the Air Force, Air Force Center for Environmental Excellence, DERA Restoration Division, 3300 Sidney Brooks, Brooks City-Base, Texas. July.

Tetra Tech, Inc. (Tetra Tech)

2004b *Basewide Groundwater Monitoring Program Report, Summer 2004, Installation Restoration Program Site 2, Vandenberg Air Force Base, California.* Prepared for Department of the Air Force 30 CES/CEVR, 806 13th Street, Suite 116, Vandenberg Air Force Base, California, and Department of the Air Force, Headquarters Air Force Center for Environmental Excellence/ICS, 3300 Sidney Brooks, Brooks City-Base, Texas. December.

Tetra Tech, Inc. (Tetra Tech)

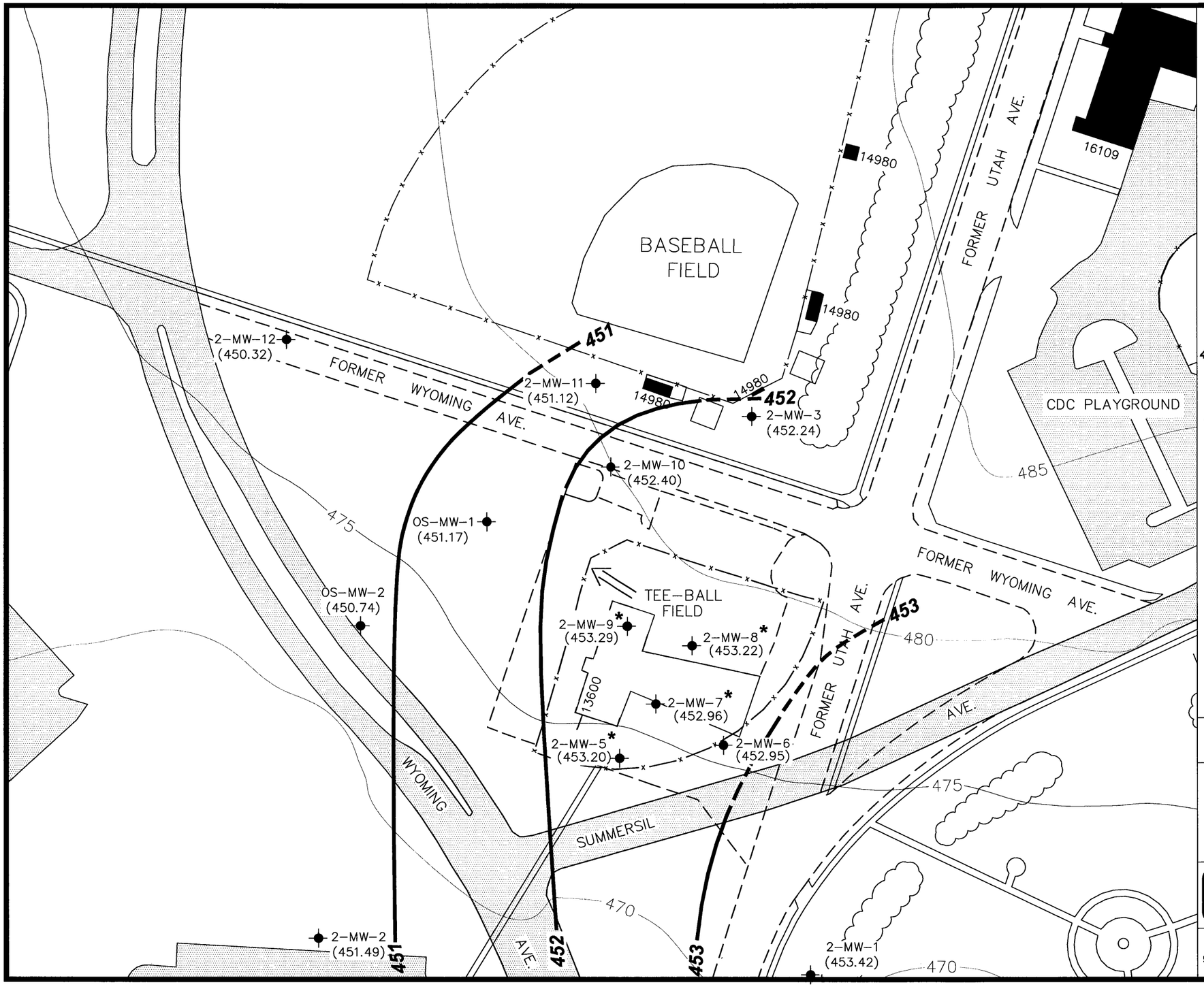
2005 *Waste Management Plan Addendum. Final.* 730 CES/CEVR, Installation Restoration Program, Vandenberg Air Force Base, California, and Headquarters Air Force Space Command, Peterson Air Force Base, Colorado. February.

U.S. Air Force

1997 *Long-Term Monitoring Optimization Guide, Final, Version 1.1.* Headquarters Air Force Center for Environmental Excellence, Brooks Air Force Base, Texas. October.

U.S. Air Force

2002 *Headquarters Thirtieth Space Wing, Vandenberg AFB, California. Hazardous Waste Management Plan, 30 SW Plan 32-7043-A, Change 1.* HQ 30th Space Wing, Vandenberg Air Force Base, California 93437-6261. April.



LEGEND

- CONTOUR OF GROUND SURFACE ELEVATION IN FEET ABOVE MSL (5-FOOT INTERVALS) (NAVD 1988)
- FENCE
- FORMER ROAD OR STREET
- PAVED ROAD OR STREET
- BUILDING
- DEMOLISHED BUILDING
- FORMER CONCRETE OR PAVED AREAS
- CONCRETE OR PAVED AREAS
- VEGETATION LINE
- 2-MW-11 (451.12) GROUNDWATER MONITORING WELL WITH GROUNDWATER ELEVATION
- 452 — 452 GROUNDWATER ELEVATION CONTOUR APPROXIMATED BY LINEAR INTERPOLATION (DASHED WHERE INFERRED)
- INFERRED GROUNDWATER FLOW DIRECTION
- TEE-BALL FIELD FENCE
- * GROUNDWATER ELEVATION NOT USED IN ESTIMATION OF CONTOURS; NON-VENTED WELLS PART OF REMOTE SAMPLING SYSTEM.

NOTE(S): GROUNDWATER ELEVATIONS IN FEET ABOVE MEAN SEA LEVEL AS MEASURED IN FEBRUARY 2006.

N

0 37.5' 75' 112.5'
SCALE

UNITED STATES AIR FORCE
VANDENBERG AIR FORCE BASE

SITE 2
OLD BASE SERVICE STATION
SITE PLAN AND
GROUNDWATER CONTOURS
WINTER 2006

TETRA TECH, INC.
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Santa Barbara, CA 93110-2847

TASK NO.	DATE	DRAWN BY	MADE FROM	DWG NO.	Figure
99105-18	5/29/06	RANDALL	TAB21	5534	1

BASEBALL FIELD

TEE–BALL FIELD

CDC PLAYGROUND

FORMER UTAH AVE.

FORMER WYOMING AVE.

SUMMERSIL AVE.

FORMER UTAH AVE.

14980

16109

13600

475

470

2–MW–12
As 9.28
Mg 206,000
Mo 18.4
Na 1,610,000

2–MW–11
Ba 290
Ca 244,000
Mg 354,000
Mo 21.5
K 16,800
Se 41.9
Na 2,410,000

2–MW–10
Cd 28.8
Co 32.2
Mg 267,000
Mo 43
K 13,900
Se 7.46
Na 2,000,000

2–MW–3
Mg 152,000
Mo 15.4
Na 1,080,000
All SVOCs ND

OS–MW–1
Cd 52.3
Mg 244,000
Mo 35.3
Se 6.99
Na 1,530,000
TPHg ND
1,2–DCA 0.46
DIPE 1.3
All SVOCs ND

2–MW–9
Cd 84.8
Ca 212,000
Mg 350,000
Mo 18.4
K 17,600
Se 46.8
Na 2,430,000
TPHg ND
All VOCs ND
All SVOCs ND

2–MW–8
Al 5,750
Be 7.86
Cd 35
Co 43.9
Mg 355,000
Mo 18.4
K 13,900
Se 38.1
Na 2,440,000
TPHg 2.8
Benzene 67
Ethylbenzene 56
m,p–Xylenes 290
o–Xylene 71
Toluene 21
2–Methylnaphthalene 27
Naphthalene (as SVOC) 23
Naphthalene (as PAH) 21

OS–MW–2
Mg 188,000 (192,000)
Mo 12.3 (ND)
Se 9.2 (11.4)
Na 1,270,000 (1,290,000)
TPHg ND
All VOCs ND
All SVOCs ND
All PAHs ND

2–MW–7
Be 1.62
Cd 7.93
Mg 257,000
Mo 23
K 16,300
Se 33
Na 1,740,000
Zn 112
TPHg 0.29
Benzene 1.7
Ethylbenzene 2.2
m,p–Xylenes 30
o–Xylene 11
Toluene 0.8
TCE 0.36
All SVOCs ND

2–MW–5
Mg 248,000
Mo 13.8
K 14,500
Se 21.2
Na 1,530,000
All SVOCs ND

2–MW–1
Cd 11.8 (10.3)
Co 13.7 (19.1)
Mg 283,000 (308,000)
Mo 13.8 (ND)
Se 39.5 (41.7)
Na 2,230,000 (2,370,000)
All SVOCs ND

LEGEND

- 480 — CONTOUR OF GROUND SURFACE ELEVATIONS IN FEET ABOVE MSL (5–FOOT INTERVALS) (NAVD 1988)
- x — FENCE
- FORMER ROAD OR STREET
- PAVED ROAD OR STREET
- 14980 — BUILDING
- 13600 — DEMOLISHED BUILDING
- FORMER CONCRETE OR PAVED AREAS
- CONCRETE OR PAVED AREAS
- VEGETATION LINE
- 2–MW–1 — GROUNDWATER MONITORING WELL
- x — TEE–BALL FIELD FENCE

NOTE(S): RESULTS FOR ALL COMPOUNDS ARE IN µg/L.
METALS RESULTS ARE FOR FILTERED GROUNDWATER WITH CONCENTRATIONS ABOVE BTVs. RESULTS IN PARENTHESES ARE FROM DUPLICATE SAMPLES.

N

0 37.5' 75' 112.5'

SCALE

UNITED STATES AIR FORCE
VANDENBERG AIR FORCE BASE

SITE 2
OLD BASE SERVICE STATION
ANALYTICAL RESULTS
WINTER 2006

TETRA TECH, INC.
4213 State Street, Suite 100
Santa Barbara, CA 93110–2847

TASK NO.	DATE	DRAWN BY	MADE FROM	DWG NO.	Figure
99105–18	5/29/06	RANDALL	TAB21	5580	2

2-MW-10	Benzene	Toluene	Naphthalene	Al	Be	Cd	Se	Tl
Dec-99	0.0472	ND	0.137	NA	NA	60.2	NA	NA
Fall-00	ND	ND	ND	ND	ND	80.4	23.5	ND
Win-01	ND	ND	ND	ND	ND	78.8	14.3	ND
Spr-01	ND	0.53	ND	ND	ND	76.3	20.9	ND
Sum-01	ND	ND	ND	232	ND	77.4	32.3	ND
Fall-01	ND	ND	ND	277	ND	88.1	27.4	71.1
Win-02*	ND	ND	ND	651	ND	71.8	22.6	ND
Sum-02	ND	ND	NA	341	ND	87.5	9.67	ND
Win-03	ND	ND	NA	622	ND	11.3	20.8	ND
Sum-03	ND	ND	NA	939	2.7	59.7	23.9	ND

2-MW-12	Cd	Al	Se	Se	Tl
Spr-01	36.3	ND	ND	ND	ND
Sum-01	36.1	ND	ND	ND	ND
Fall-01	31.6	ND	ND	66.1	69.7
Win-02*	ND	284	ND	ND	ND
Spr-02	12.7	186	ND	ND	ND
Sum-02	17.4	ND	ND	ND	ND
Fall-02	ND	ND	40.7	ND	ND
Win-03	8.12	ND	52.1	ND	ND
Spr-03	1.9	26.6	ND	ND	ND
Fall-03	ND	33.6	3.3	ND	ND

2-MW-11	Cd	Al	Se	Tl
Spr-01	5.87	ND	25.3	ND
Sum-01	5.39	ND	24.1	ND
Fall-01	7.18	ND	25.2	66.1
Win-02*	4.33	341	25.8	ND
Spr-02	5.11	242	55	ND
Sum-02	5.8	ND	23.7	ND
Fall-02	4.56	ND	87.5	ND
Win-03	5.74	ND	148	ND
Spr-03	5	33.2	36.3	ND
Fall-03	6.5	26.2	36.3	ND

2-MW-3	Benzene	Al	Cd	Se	Tl
Dec-99	0.0465	NA	2.32	NA	NA
Fall-00	ND	ND	12	ND	ND
Win-01	ND	ND	ND	ND	ND
Spr-01	ND	ND	4.13	ND	ND
Sum-01	ND	ND	6.6	ND	ND
Fall-01	ND	ND	2.05	ND	44.9
Win-02*	ND	ND	5.84	ND	ND
Spr-02	ND	118	7	ND	ND
Sum-02	ND	ND	5.98	ND	ND
Win-03	ND	ND	4.17	23.1	ND
Sum-03	ND	ND	ND	ND	ND

OS-MW-1	Al	Cd	Se	Tl
Dec-99	NA	38.1	NA	NA
Fall-00	ND	85.6	14.8	ND
Win-01	ND	54.7	9.11	ND
Spr-01	ND	54.5	16.3	ND
Sum-01	ND	50.8	15.8	ND
Fall-01	ND	60.5	13.6	65.2
Win-02*	313	46.6	ND	ND
Spr-02	NA	NA	NA	NA
Sum-02	ND	58.8	ND	ND
Fall-02	NA	NA	NA	NA
Win-03	ND	63.2	58.3	ND
Spr-03	NA	NA	NA	NA
Sum-03	42.8	64.7	18	ND
Fall-03	NA	NA	NA	NA

2-MW-9	Benzene	Toluene	Naphthalene	Al	Cd	Se	Tl
Dec-99	0.0485	ND	0.205	NA	42.3	NA	NA
Fall-00	ND	ND	ND	ND	34	43.4	ND
Win-01	ND	ND	ND	ND	74.5	37.5	ND
Spr-01	ND	0.59	ND	268	76.5	40.3	ND
Sum-01	ND	ND	ND	ND	81.1	42.0	ND
Fall-01	ND	ND	ND	483	96	47.8	78.4
Win-02*	ND	ND	ND	548	72.1	31.1	ND
Sum-02	ND	ND	ND	ND	73.4	31.2	ND
Win-03	ND	ND	ND	265	12.4	88.6	ND
Sum-03	ND	ND	ND	284	85.8	56.7	ND

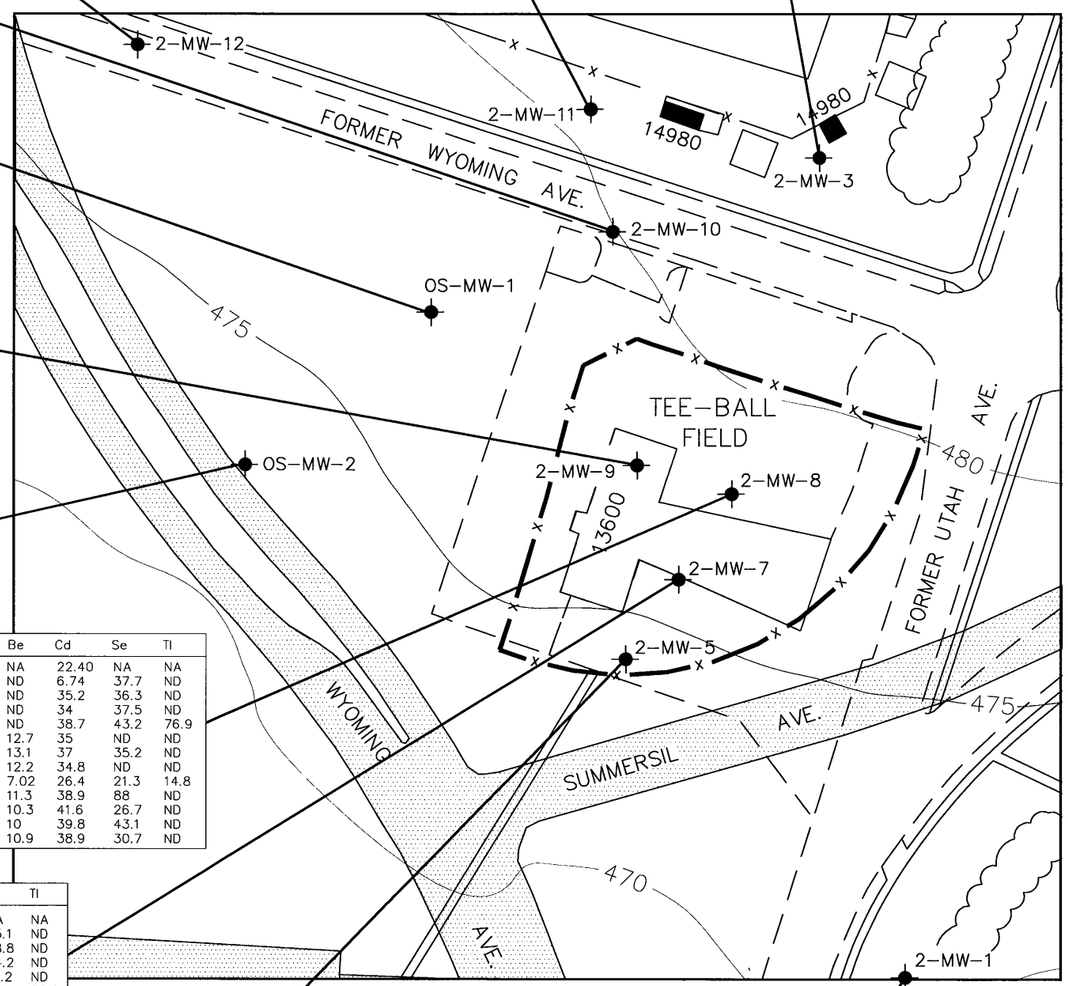
OS-MW-2	Cd	Al	Se	Tl
Spr-01	6.82	ND	10.7	ND
Sum-01	13.9	ND	13.6	ND
Fall-01	2.56	ND	ND	38.5
Win-02*	10.9	211	ND	ND
Sum-02	10.3	ND	ND	ND
Win-03	10.4	ND	34.4	ND
Sum-03	9.8	20.1	12.3	ND

2-MW-8	Benzene	Toluene	Ethylbenzene	m,p-Xylenes	o-Xylene	TPHg	Naphthalene	Al	Be	Cd	Se	Tl
Dec-99	0.375	2.06	1.38	6.26	2.21	1.9	1.07	NA	NA	22.40	NA	NA
Fall-00	3.5	5.3	5.2	29	6.0	0.69	ND	1,380	ND	6.74	37.7	ND
Win-01	4.40	11	10	42	14	0.62	ND	1,260	ND	35.2	36.3	ND
Sum-01	5.1	11	8.7	37	12	0.88	5.3	1,650	ND	34	37.5	ND
Fall-01	5.3	6.4	4.9	37	10	0.64	ND	1,970	ND	38.7	43.2	76.9
Win-02*	36	64	62	250	74	4.9	21	13,500	12.7	35	ND	ND
Spr-02	7.7	12	12	61	21	1.2	10	12,700	13.1	37	35.2	ND
Sum-02	23	35	37	160	53	2.8	18	12,300	12.2	34.8	ND	ND
Fall-02	18	23	31	72	35	2.3	12	3,970	7.02	26.4	21.3	14.8
Win-03	26	37	36	180	52	3.6	16	7,410	11.3	38.9	88	ND
Spr-03	32.5	22.7	34.7	230	56.2	2.72	15.2	8,600	10.3	41.6	26.7	ND
Sum-03	22.5	12.1	32.3	125	24.7	2.12	18.5	8,320	10	39.8	43.1	ND
Fall-03	33.0	24.1	26.9	227	61.6	2.27	25.7	9,300	10.9	38.9	30.7	ND

2-MW-7	Benzene	Toluene	Ethylbenzene	m,p-Xylenes	o-Xylene	TPHg	Al	Be	Cd	Se	Tl
Dec-99	ND	ND	ND	ND	ND	ND	NA	NA	2.79	NA	NA
Fall-00	ND	ND	ND	4.6	ND	0.11	470	ND	4.4	35.1	ND
Win-01	ND	ND	ND	ND	ND	ND	373	ND	6.39	28.8	ND
Spr-01	ND	0.64	ND	ND	ND	ND	423	ND	6.62	34.2	ND
Sum-01	ND	ND	ND	ND	ND	ND	408	ND	6.78	31.2	ND
Fall-01	ND	ND	ND	ND	ND	ND	666	ND	29.7	46.1	59.9
Win-02*	ND	ND	ND	ND	4.9	0.27	1,180	ND	17.5	31.3	ND
Sum-02	0.69	2.2	2.4	22	8.6	0.25	200	ND	1.94	22.3	ND
Win-03	ND	1.2	1.7	17	6.4	0.15	475	ND	8.63	63.1	ND
Sum-03	0.23	0.17	0.1	7.88	2.59	0.09	519	1.5	7.6	57.5	ND

2-MW-5	Benzene	m,p-Xylenes	o-Xylene	Al	Cd	Se	Tl
Dec-99	0.0675	0.316	0.114	NA	ND	NA	NA
Fall-00	ND	ND	ND	ND	4.9	ND	ND
Win-01	ND	ND	ND	ND	298	ND	ND
Spr-01	ND	ND	ND	ND	141	14.9	ND
Sum-01	ND	ND	ND	ND	59.3	7.08	ND
Fall-01	ND	ND	ND	ND	137	10.7	90.0
Win-02*	ND	ND	ND	209	4.74	ND	ND
Sum-02	ND	ND	ND	ND	13.6	ND	ND
Win-03	ND	ND	ND	ND	6.68	47.6	ND
Sum-03	ND	ND	ND	ND	4.5	62.6	ND

2-MW-1	Naphthalene	Al	Cd	Se	Tl
Dec-99	0.124	NA	10.8	NA	NA
Fall-00	ND	238	55.4	39.8	ND
Win-01	ND	380	12.4	35.8	ND
Spr-01	ND	293	12.7	32.4	ND
Sum-01	ND	ND	10.2	37.6	ND
Fall-01	ND	464	12.4	43.8	66.6
Win-02*	ND	662	11.1	32	ND
Sum-02	ND	288	10.7	23.9	ND
Win-03	ND	ND	79.6	127	ND
Sum-03	ND	383	13.1	42.9	ND



LEGEND

- 480 — CONTOUR OF GROUND SURFACE ELEVATION IN FEET ABOVE MSL (5-FOOT INTERVALS) (NAVD 1988)
- —x— FENCE
- FORMER ROAD OR STREET
- PAVED ROAD OR STREET
- 14980 — BUILDING
- 13600 — DEMOLISHED BUILDING
- FORMER CONCRETE OR PAVED AREAS
- CONCRETE OR PAVED AREAS
- VEGETATION LINE
- 2-MW-1 — GROUNDWATER MONITORING WELL
- —x— TEE-BALL FIELD FENCE
- NA — NOT ANALYZED
- ND — NOT DETECTED; RESULT IS LESS THAN THE METHOD DETECTION LIMIT.
- * — INSTALLED MICROPURGE PUMP

NOTE(S): RESULTS FOR ALL COMPOUNDS EXCEPT TPHg ARE IN µg/L. TPHg RESULTS ARE IN mg/L. METALS RESULTS ARE FOR FILTERED GROUNDWATER. BTVs ARE AS FOLLOWS:
Al–1,200µg/L
Cd–5µg/L
Be–0.3µg/L
Se–3µg/L
Tl–1µg/L

N

0 37.5' 75' 112.5'
SCALE

UNITED STATES AIR FORCE
VANDENBERG AIR FORCE BASE

SITE 2
OLD BASE SERVICE STATION
HISTORICAL ANALYTICAL RESULTS OF
BGMP KEY CONTAMINANTS OF CONCERN
DECEMBER 1999 THROUGH FALL 2003

TETRA TECH, INC.
4213 State Street, Suite 100
Santa Barbara, CA 93110-2847

TASK NO.	DATE	DRAWN BY	MADE FROM	DWG NO.	Figure
99105-18	10/10/05	PRICHARD	TAB21	5212	3A

2-MW-10	Benzene	Toluene	Al	Be	Cd	Se	Tl
Win-04	ND	ND	505	1.7	69.9	21.1	ND
Sum-04	ND	ND	213	ND	64.5	24.1	ND
Win-05	NA	NA	521	1.5	71.3	28.8	6.44
Sum-05	NA	NA	ND	ND	ND	ND	7.44
Win-06	NA	NA	74.7	ND	28.8	7.46	ND

2-MW-11	Al	Cd	Se	Tl
Win-04	23	4.9	38.6	1.4
Sum-04	ND	4.59	42.8	6.17
Fall-04	ND	7.1	44.1	ND
Win-05	ND	8.21	45.7	8.56
Spr-05	ND	3.2	45.6	11.1
Sum-05	ND	7.74	46	6.03
Fall-05	ND	3.69	40.8	6.69
Win-06	ND	5	41.9	ND

2-MW-3	Benzene	Al	Cd	Se	Tl
Win-04	ND	17.8	ND	ND	ND
Sum-04	ND	ND	ND	ND	6.03
Win-05	NA	ND	ND	ND	ND
Sum-05	ND	ND	ND	ND	ND
Win-06	NA	ND	ND	ND	ND

2-MW-12	Al	Cd	Se	Tl
Win-04	19	ND	ND	1.80
Sum-04	ND	ND	ND	ND
Fall-04	ND	ND	ND	ND
Win-05	ND	ND	ND	ND
Spr-05	ND	ND	ND	5.5
Sum-05	ND	2.07	ND	5.99
Fall-05	ND	ND	ND	7.28
Win-06	ND	ND	ND	ND

OS-MW-1	Al	Cd	Se	Tl
Win-04	44.6	73.8	17.1	0.85
Spr-04	NA	NA	NA	NA
Sum-04	ND	64.9	15.2	ND
Fall-04	NA	NA	NA	NA
Win-05	ND	72.3	13.3	ND
Sum-05	ND	64	13.5	ND
Win-06	ND	52.3	6.99	ND

2-MW-9	Benzene	Toluene	Naphthalene	Al	Cd	Se	Tl
Win-04	ND	ND	ND	132	83.5	33.4	1.10
Sum-04	ND	ND	ND	ND	84.4	44.7	10.6
Win-05	NA	NA	ND	104	87.2	48.3	ND
Sum-05	ND	ND	ND	61.5	86.1	48.3	6.26
Win-06	ND	ND	ND	ND	84.8	46.8	ND

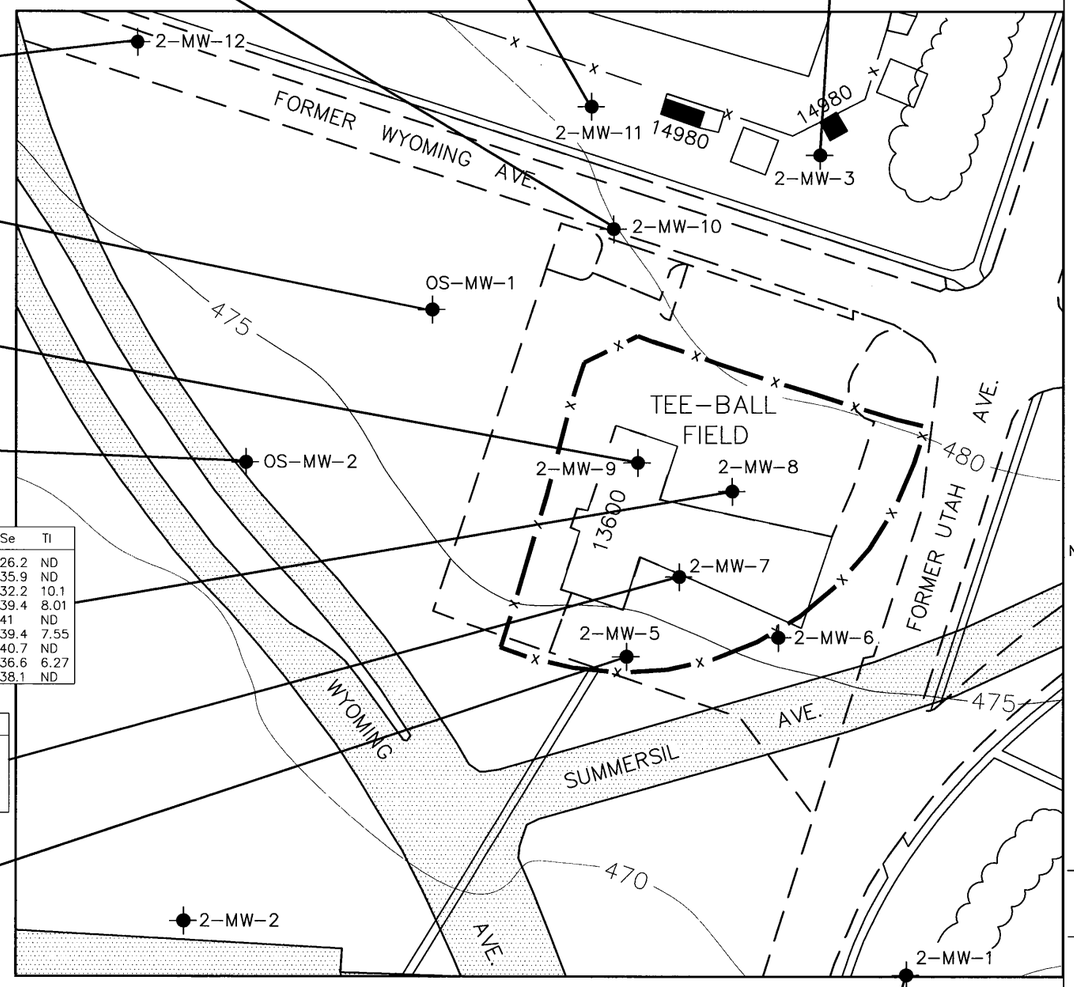
OS-MW-2	Al	Cd	Se	Tl
Win-04	26.9	5.2	8.3	1.30
Sum-04	ND	2.25	15.9	ND
Win-05	ND	2.52	6.56	ND
Sum-05	ND	3.84	7.79	ND
Win-06	ND	3.39	11.4	ND

2-MW-8	Benzene	Toluene	Ethylbenzene	m,p-Xylenes	o-Xylene	TPHg	Naphthalene	Al	Be	Cd	Se	Tl
Win-04	33.8	9.98	34.1	218	48.7	2.55	28.8	6,880	9.8	39.6	26.2	ND
Spr-04	22	6.7	20	110	28	1.5	9.7	5,330	8.42	40.5	35.9	ND
Sum-04	21	5.5	19	90	28	1.2	9.2	5,100	8.25	40.2	32.2	10.1
Fall-04	39	8.9	34	190	48	2.3	21	5,420	7.79	39.5	39.4	8.01
Win-05	57	11	39	240	51	NA	17	5,070	7.47	39.5	41	ND
Spr-05	36	8.7	26	160	42	NA	22	5,430	7.82	36.8	39.4	7.55
Sum-05	37	7.7	22	53	41	1.4	16	5,060	6.81	37.6	40.7	ND
Fall-05	35	7.5	30	160	40	NA	12	4,960	7.14	33.9	36.6	6.27
Win-06	67	21	56	290	71	2.8	23	5,750	7.68	35	38.1	ND

2-MW-7	Benzene	Toluene	Ethylbenzene	m,p-Xylenes	o-Xylene	TPHg	Al	Be	Cd	Se	Tl
Win-04	0.32	ND	0.14	8.08	2.97	0.09a	224	ND	6.8	27.2	ND
Sum-04	0.45	ND	0.29	11	4.3	0.1	574	2.43	10.3	37.3	9.7
Win-05	NA	NA	NA	NA	NA	NA	662	1.64	7.06	37	9.98
Sum-05	1.5	0.74	1.3	31	11	0.2	543	1.71	7.63	35.8	5.48
Win-06	1.7	0.8	2.2	30	11	0.29	652	1.62	7.93	33	ND

2-MW-5	Benzene	m,p-Xylenes	o-Xylene	Al	Cd	Se	Tl
Win-04	ND	ND	ND	21.9	3.4	16.9	ND
Sum-04	ND	ND	ND	ND	14.1	17.6	5.88
Win-05	NA	NA	NA	ND	4.96	25	ND
Sum-05	NA	NA	NA	ND	5.49	24.8	7.01
Win-06	NA	NA	NA	ND	3.74	21.2	ND

2-MW-1	Naphthalene	Al	Cd	Se	Tl
Win-04	D	464	14.1	35	1.30
Sum-04	ND	408	12	40.1	7.55
Win-05	ND	386	11	39.4	7.62
Sum-05	ND	445	14	45.7	9.77
Win-06	ND	413	11.8	41.7	ND



LEGEND

- 480 — CONTOUR OF GROUND SURFACE ELEVATION IN FEET ABOVE MSL (5-FOOT INTERVALS) (NAVD 1988)
- x — FENCE
- FORMER ROAD OR STREET
- PAVED ROAD OR STREET
- 14980 — BUILDING
- 13600 — DEMOLISHED BUILDING
- FORMER CONCRETE OR PAVED AREAS
- CONCRETE OR PAVED AREAS
- VEGETATION LINE
- 2-MW-1 — GROUNDWATER MONITORING WELL
- x — TEE-BALL FIELD FENCE
- NA — NOT ANALYZED
- ND — NOT DETECTED; RESULT IS LESS THAN THE METHOD DETECTION LIMIT.
- a — RESULT WAS QUALIFIED FOR BLANK CONTAMINATION (B-QUALIFIED) AND IS SUSPECTED TO BE A FALSE POSITIVE.

NOTE(S): RESULTS FOR ALL COMPOUNDS EXCEPT TPHg ARE IN µg/L. TPHg RESULTS ARE IN mg/L. METALS RESULTS ARE FOR FILTERED GROUNDWATER. BTVs ARE AS FOLLOWS:
Al-1,200µg/L
Be-0.3µg/L
Cd-5µg/L
Se-3µg/L
Tl-1µg/L

N

0 37.5' 75' 112.5'
SCALE

UNITED STATES AIR FORCE
VANDENBERG AIR FORCE BASE

SITE 2
OLD BASE SERVICE STATION
HISTORICAL ANALYTICAL RESULTS OF
BGMP KEY CONTAMINANTS OF CONCERN
WINTER 2004 THROUGH WINTER 2006

TETRA TECH, INC.
4213 State Street, Suite 100
Santa Barbara, CA 93110-2847

TASK NO.	DATE	DRAWN BY	MADE FROM	DWG NO.	Figure
99105-18	4/14/06	PRICHARD	TAB21	5581	3B

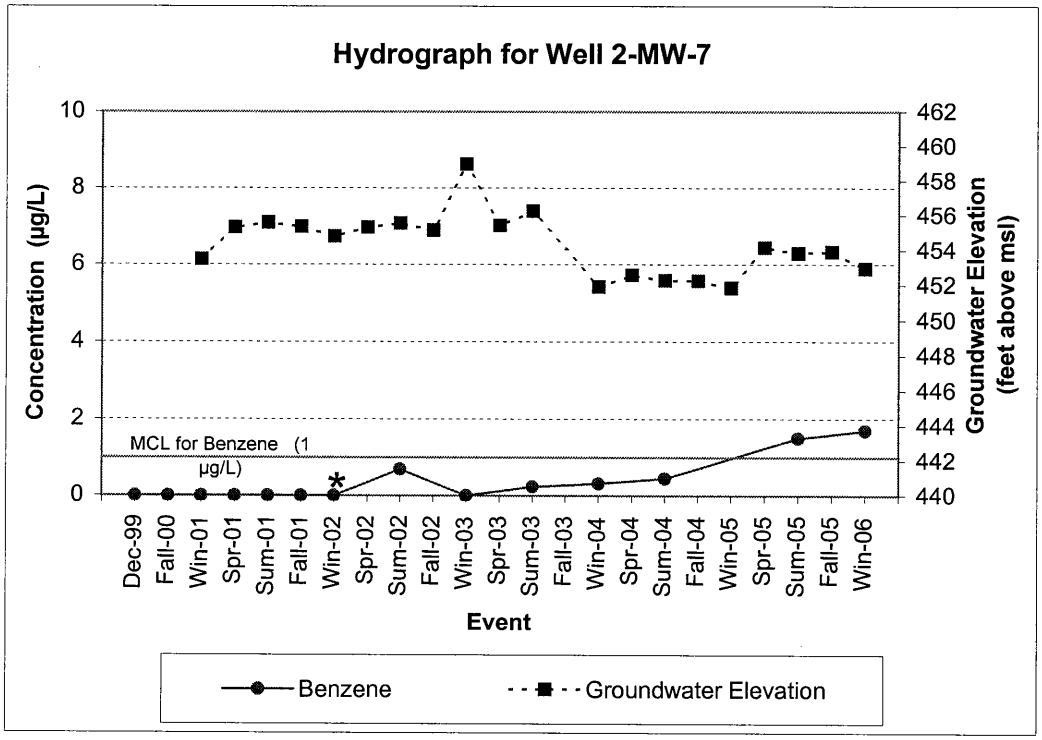
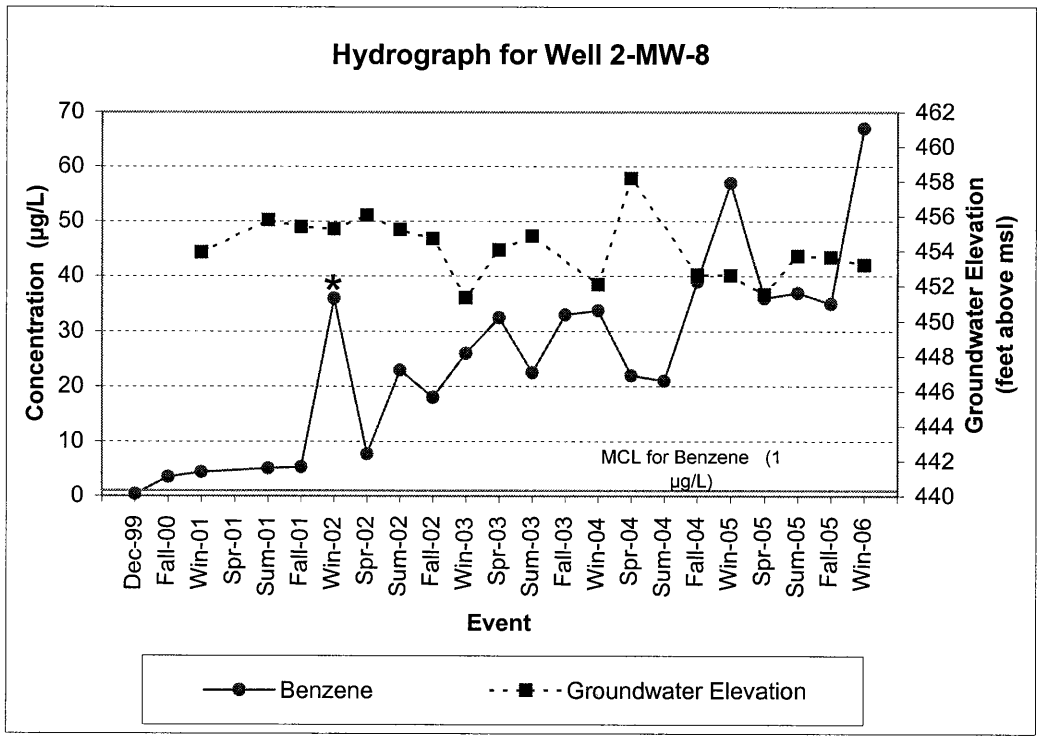
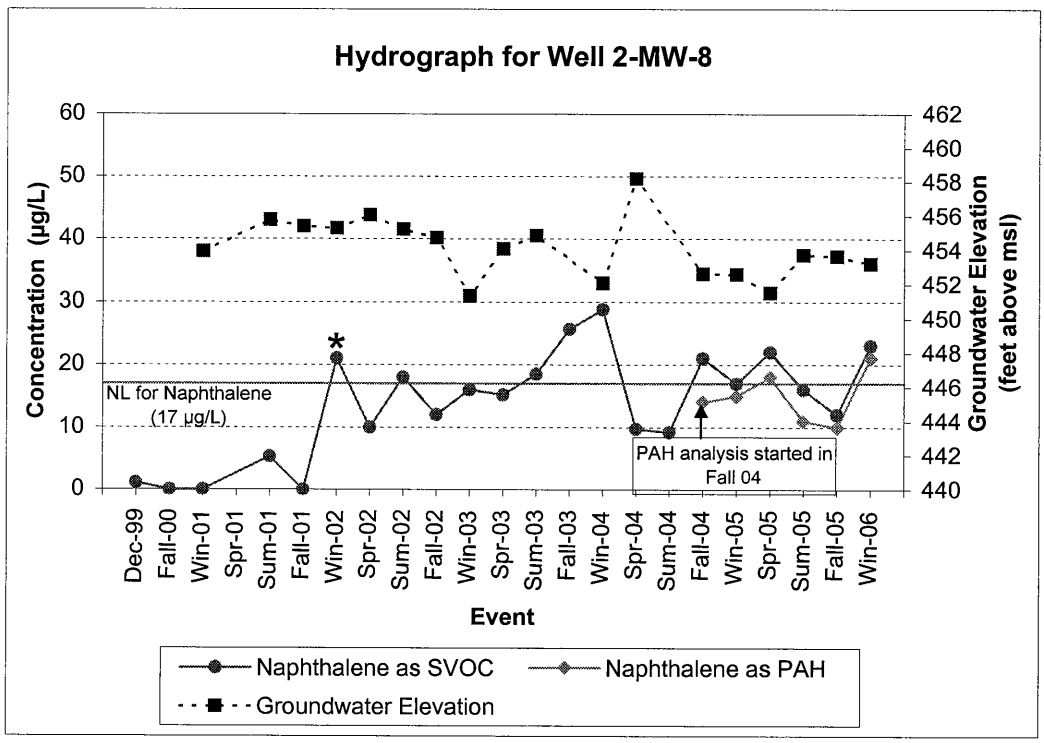


Figure 4. Groundwater Elevations and Concentrations of Benzene and Naphthalene at Site 2. Naphthalene was not detected in groundwater from well 2-MW-7.





* - MicroPurge pump installed during winter 2002.

NL - California Department of Health Services (DHS) notification level (No MCL is available for naphthalene)

Figure 4. Groundwater Elevations and Concentrations of Benzene and Naphthalene at Site 2.

Table 1
Groundwater Elevations
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

Monitoring Well	Top of Casing Elevation (feet above msl)	Date Measured	Groundwater Depth (feet below TOC)	Groundwater Elevation (feet above msl)			
		Winter 2006	Winter 2006	Winter 2006	Fall 2005	Summer 2005	Spring 2005
2-MW-1	468.26	06-Feb-06	14.84	453.42	453.56	453.89	453.69
2-MW-2	468.34	06-Feb-06	16.85	451.49	NM	NM	NM
2-MW-3	482.84	06-Feb-06	30.60	452.24	452.36	452.77	452.54
2-MW-5[a]	474.50	06-Feb-06	21.30	453.20	453.21	453.01	453.10
2-MW-6	475.38	06-Feb-06	22.43	452.95	NM	NM	NM
2-MW-7[a]	475.39	06-Feb-06	22.43	452.96	453.93	453.84	454.18
2-MW-8[a]	476.51	06-Feb-06	23.29	453.22	453.66	453.73	451.54
2-MW-9[a]	476.24	06-Feb-06	22.95	453.29	453.44	452.91	453.73
2-MW-10	479.94	06-Feb-06	27.54	452.40	452.51	452.44	452.40
2-MW-11	482.10	06-Feb-06	30.98	451.12	451.15	451.56	451.32
2-MW-12	477.77	06-Feb-06	27.45	450.32	450.57	450.67	450.39
OS-MW-1	476.28	06-Feb-06	25.11	451.17	451.30	451.76	451.49
OS-MW-2	471.50	06-Feb-06	20.76	450.74	450.90	451.28	451.04

Definition(s):

msl - mean sea level
NM - not measured
TOC - top of well casing

Note(s):

a - Non-vented well; part of remote sampling system.

Table 2
Water Quality Parameters
Winter 2006
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

Sampling Location	2-MW-1	2-MW-3	2-MW-5	2-MW-7	2-MW-8	2-MW-9
Sample ID	V2MW1	V2MW3	V2MW5	V2MW7	V2MW8M	V2MW9
Collection Date	06-Feb-06	06-Feb-06	06-Feb-06	06-Feb-06	06-Feb-06	06-Feb-06
Field Parameters[1]:						
Temperature (°Celsius)	17.10	18.51	12.56	13.90	13.82	13.23
Conductivity (µmhos/cm)	10,291	5,750	7,273	8,695	12,037	11,163
pH	5.35	6.39	6.05	5.84	4.69	5.72
Turbidity (NTUs)	25.3	2.14	1.93	1.01	0.54	3.60

Sampling Location	2-MW-10	2-MW-11	2-MW-12	OS-MW-1	OS-MW-2
Sample ID	V2MW10F	V2MW11F	V2MW12F	VOSMW1	VOSMW2
Collection Date	06-Feb-06	06-Feb-06	06-Feb-06	06-Feb-06	06-Feb-06
Field Parameters[1]:					
Temperature (°Celsius)	18.78	17.80	19.28	19.19	19.22
Conductivity (µmhos/cm)	9,090	11,390	7,959	7,760	841
pH	5.78	6.04	7.42	5.84	7.08
Turbidity (NTUs)	41.6	3.39	6.55	12.8	4.75

Definition(s):

µmhos/cm - micromhos per centimeter
NTU - nephelometric turbidity unit

Note(s):

1 - field parameters measured immediately prior to sampling.

Table 3
Metals in Groundwater
Winter 2006
EPA Method SW6010B (µg/L)
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

Sample Location					2-MW-1			2-MW-1			2-MW-3			2-MW-5			2-MW-7		
Sample ID					**V2MW1F**			**V99W603F (D)**			**V2MW3F**			**V2MW5F**			**V2MW7F**		
Collection Date					**06-Feb-06**			**06-Feb-06**			**06-Feb-06**			**06-Feb-06**			**06-Feb-06**		
Dissolved Metals	**MDL[1]**	**PQL[1]**	**Primary MCL**	**BTV**															
Aluminum	15	60	1,000	1,200	382		g	413		g	60	U	g	60	U	g	652		g
Antimony[2]	40	100	6	10	40	U	g	40	U	g	40	U	g	40	U	g	40	U	g
Arsenic	4	10	10	7	5	U	g	5	U	g	5	U	g	5	U	g	5	U	g
Barium	1	5	1,000	276	30		g	32.1		g	91.6		g	210		g	152		g
Beryllium[2]	1	5	4	0.3	1	U	g	1	U	g	1	U	g	1	U	g	1.62	J	q
Cadmium	1	5	5	5	**11.8**		g	**10.3**		g	2	U	g	3.74	J	q	**7.93**		g
Calcium	22	500	N/A	197,000	152,000		g	165,000		g	120,000		g	170,000		g	165,000		g
Chromium	1	10	50	20	15.5		g	20		g	5	U	g	5	U	g	5	U	g
Cobalt	2	15	N/A	13	13.7	J	q	19.1		g	5	U	g	5	U	g	6.22	J	q
Copper	1	10	1,300	58	5	U	g	5	U	g	5	U	g	5	U	g	5.79	J	q
Iron	4	100	N/A	3,530	69.9	J	q	53.4	J	q	855		g	44.2	J	q	40	U	g
Lead	2	3	15	3	2	U	g	2	U	g	2	U	g	2	U	g	2	U	g
Magnesium	26	200	N/A	119,000	283,000		g	308,000		g	152,000		g	248,000		g	257,000		g
Manganese	1	5	N/A	971	198		g	212		g	380		g	12.5		g	43.8		g
Molybdenum	2	15	N/A	12	13.8	J	q	10	U	g	15.4		g	13.8	J	q	23		g
Nickel	5	20	100	490	**190**		g	**210**		g	**211**		g	100		g	**106**		g
Potassium	41	1,000	N/A	13,300	10,700		g	12,100		g	12,000		g	14,500		g	16,300		g
Selenium[2]	5	10	50	3	39.5		g	41.7		g	5	U	g	21.2		g	33		g
Silver[2]	1	10	N/A	0.2	5	U	g	5	U	g	5	U	g	5	U	g	5	U	g
Sodium	23	500	N/A	420,000	2,230,000		g	2,370,000		g	1,080,000		g	1,530,000		g	1,740,000		g
Thallium[2]	5	10	2	1	5	U	g	5	U	g	5	U	g	5	U	g	5	U	g
Vanadium	1	10	N/A	28	5	U	g	5	U	g	5	U	g	5	U	g	5	U	g
Zinc	2	20	N/A	80	7.36	J	q	5.37	J	q	21.2		g	12.9	J	q	112		g

Table 3
Metals in Groundwater
Winter 2006
EPA Method SW6010B (µg/L)
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

Sample Location					2-MW-8	2-MW-9	2-MW-10	2-MW-11	2-MW-12
Sample ID					V2MW8F	V2MW9F	V2MW10F	V2MW11F	V2MW12F
Collection Date					06-Feb-06	06-Feb-06	06-Feb-06	06-Feb-06	06-Feb-06
Dissolved Metals	MDL[1]	PQL[1]	Primary MCL	BTV					
Aluminum	15	60	1,000	1,200	**5,750** g	60 U g	74.7 J q	60 U g	60 U g
Antimony[2]	40	100	6	10	40 U g	40 U g	40 U g	40 U g	40 U g
Arsenic	4	10	10	7	5 U g	5.55 J q	5.93 J q	5 U g	9.28 J q
Barium	1	5	1,000	276	129 g	199 g	73.8 g	290 g	235 g
Beryllium[2]	1	5	4	0.3	**7.86** g	1 U g	1 U g	1 U g	1 U g
Cadmium	1	5	5	5	**35** g	**84.8** g	**28.8** g	5 g	2 U g
Calcium	22	500	N/A	197,000	195,000 g	212,000 g	132,000 g	244,000 g	181,000 g
Chromium	1	10	50	20	5 U g	5 U g	5 U g	5 U g	5 U g
Cobalt	2	15	N/A	13	43.9 g	5 U g	32.2 g	5 U g	7.57 J q
Copper	1	10	1,300	58	44.1 g	9.28 J q	5 U g	5 U g	5 U g
Iron	4	100	N/A	3,530	145 g	40 U g	288 g	40 U g	359 g
Lead	2	3	15	3	2 U g	2 U g	2 U g	2 U g	2 U g
Magnesium	26	200	N/A	119,000	355,000 g	350,000 g	267,000 g	354,000 g	206,000 g
Manganese	1	5	N/A	971	153 g	28.2 g	331 g	37.4 g	153 g
Molybdenum	2	15	N/A	12	18.4 g	18.4 g	43 g	21.5 g	18.4 g
Nickel	5	20	100	490	**206** g	**229** g	**141** g	80.3 g	28.6 g
Potassium	41	1,000	N/A	13,300	13,900 g	17,600 g	13,900 g	16,800 g	10,400 g
Selenium[2]	5	10	50	3	38.1 g	46.8 g	7.46 J q	41.9 g	5 U g
Silver[2]	1	10	N/A	0.2	5 U g	5 U g	5 U g	5 U g	5 U g
Sodium	23	500	N/A	420,000	2,440,000 g	2,430,000 g	2,000,000 g	2,410,000 g	1,610,000 g
Thallium[2]	5	10	2	1	5 U g	5 U g	5 U g	5 U g	5 U g
Vanadium	1	10	N/A	28	5 U g	5 U g	5 U g	5 U g	5 U g
Zinc	2	20	N/A	80	58.8 g	38 g	22.5 g	8.18 J q	5 U g

Table 3
Metals in Groundwater
Winter 2006
EPA Method SW6010B (µg/L)
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

Sample Location					OS-MW-1			OS-MW-2			OS-MW-2		
Sample ID					VOSMW1F			VOSMW2F			V99W604F (D)		
Collection Date					06-Feb-06			06-Feb-06			06-Feb-06		
Dissolved Metals	MDL[1]	PQL[1]	Primary MCL	BTV									
Aluminum	15	60	1,000	1,200	60	U	g	60	U	g	60	U	g
Antimony[2]	40	100	6	10	40	U	g	40	U	g	40	U	g
Arsenic	4	10	10	7	6.57	J	q	5	U	g	5.32	J	q
Barium	1	5	1,000	276	149		g	185		g	190		g
Beryllium[2]	1	5	4	0.3	1	U	g	1	U	g	1	U	g
Cadmium	1	5	5	5	**52.3**		g	3.16	J	q	3.39	J	q
Calcium	22	500	N/A	197,000	150,000		g	130,000		g	135,000		g
Chromium	1	10	50	20	5.1	J	q	5	U	g	5	U	g
Cobalt	2	15	N/A	13	5.02	J	q	5	U	g	5	U	g
Copper	1	10	1,300	58	5	U	g	5	U	g	5	U	g
Iron	4	100	N/A	3,530	327		g	461		g	409		g
Lead	2	3	15	3	2	U	g	2	U	g	2	U	g
Magnesium	26	200	N/A	119,000	244,000		g	188,000		g	192,000		g
Manganese	1	5	N/A	971	38		g	113		g	136		g
Molybdenum	2	15	N/A	12	35.3		g	12.3	J	q	10	U	g
Nickel	5	20	100	490	**212**		g	38.4		g	31.2		g
Potassium	41	1,000	N/A	13,300	12,300		g	12,800		g	13,200		g
Selenium[2]	5	10	50	3	6.99	J	q	9.2	J	q	11.4		g
Silver[2]	1	10	N/A	0.2	5	U	g	5	U	g	5	U	g
Sodium	23	500	N/A	420,000	1,530,000		g	1,270,000		g	1,290,000		g
Thallium[2]	5	10	2	1	5	U	g	5	U	g	5	U	g
Vanadium	1	10	N/A	28	5	U	g	5	U	g	5	U	g
Zinc	2	20	N/A	80	32.1		g	5.21	J	q	6.81	J	q

Table 3
Metals in Groundwater
Winter 2006
EPA Method SW6010B (µg/L)
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

Data Validity Qualifier(s):

J - The analyte was positively identified and the result is usable; however, the analyte concentration is an estimated value.
U - The analyte was not detected at or above the MDL.

Data Validity Comment(s):

g - The data met prescribed criteria as detailed in the QAPP.
q - The analyte detection was below the PQL.

Definition(s):

BTV - background threshold value
MCL - maximum contaminant level
MDL - method detection limit
µg/L - micrograms per liter
N/A - not applicable
PQL - practical quantitation limit
QAPP - Quality Assurance Project Plan

Note(s):

Bold type indicates results that were above the MCL.
Shading indicates results that were above the 95th percentile BTV.
1 - Values from QAPP Addendum (Tetra Tech 2004a).
2 - The BTV was less than the detection limit for this metal.

Table 4
VOCs in Groundwater
Winter 2006
EPA Method SW8260B (µg/L)
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

Sample Location				2-MW-7	2-MW-8	2-MW-9	OS-MW-1	OS-MW-2	OS-MW-2
Sample ID				V2MW7	V2MW8M	V2MW9	VOSMW1	VOSMW2	V99W604 (D)
Collection Date				06-Feb-06	06-Feb-06	06-Feb-06	06-Feb-06	06-Feb-06	06-Feb-06
	MDL[1]	PQL[1]	Primary MCL						
1,2-DCA	0.06	1.0	0.5	0.2 U g	0.2 U g	0.2 U g	0.46 J q	0.2 U g	0.2 U g
Benzene	0.07	0.4	1	**1.7** g	**67** g	0.2 U g	0.2 U g	0.2 U g	0.2 U g
DIPE	0.16	5.0	N/A	0.2 U g	0.2 U g	0.2 U g	1.3 J q	0.2 U g	0.2 U g
Ethylbenzene	0.12	1.0	300	2.2 g	56 g	0.2 U g	0.2 U g	0.2 U g	0.2 U g
m,p-Xylenes	0.25	2.0	1,750[2]	30 g	290 g	0.5 U g	0.5 U g	0.5 U g	0.5 U g
o-Xylene	0.13	1.0	1,750[2]	11 g	71 g	0.2 U g	0.2 U g	0.2 U g	0.2 U g
Toluene	0.11	1.0	150	0.8 J q	21 g	0.2 U g	0.2 U g	0.2 U g	0.2 U g
TCE	0.18	1.0	5	0.36 J q	0.2 U g	0.2 U g	0.2 U g	0.2 U g	0.2 U g
All other target analytes	N/A	N/A	N/A	ND	ND	ND	ND	ND	ND

Data Validity Qualifier(s):

J - The analyte was positively identified and the result is usable; however, the analyte concentration is an estimated value.
U - The analyte was not detected at or above the MDL.

Data Validity Comment(s):

g - The data met prescribed criteria as detailed in the QAPP.
q - The analyte detection was below the PQL.

Definition(s):

(D) - duplicate sample
DCA - dichloroethane
DIPE - diisopropyl ether
MCL - maximum contaminant level
MDL - method detection limit
µg/L - micrograms per liter
N/A - not applicable
ND - not detected; result is less than the MDL.
PQL - practical quantitation limit
QAPP - Quality Assurance Project Plan
TCE - trichloroethene

Note(s):

Bold type indicates results that were above the MCL.
1 - Values from QAPP Addendum (Tetra Tech 2004a).
2 - MCL of 1,750 µg/L applies to sum of *m*-xylene, *o*-xylene, and *p*-xylene.

<S2_T4_Win06_VOCs.xls>5/31/2006

Table 5
TPH as Gasoline, SVOCs, and PAHs in Groundwater
Winter 2006
EPA Methods SW8015B, SW8270C, and SW8270C SIM
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

Sample Location	Sample ID	Collection Date		TPH as gasoline (mg/L)	SVOCs (µg/L)			PAHs (µg/L)	
					2-Methylnaphthalene	Naphthalene	All Other Target Analytes	Naphthalene	All Other Target Analytes
			MDL[1]	0.02	1.8	1.6	N/A	0.024	N/A
			PQL[1]	0.1	10	10	N/A	1.0	N/A
2-MW-1	V2MW1	06-Feb-06		NA	4.8 U g	4.8 U g	ND	NA	NA
2-MW-1	V99W603 (D)	06-Feb-06		NA	4.7 U g	4.7 U g	ND	NA	NA
2-MW-3	V2MW3	06-Feb-06		NA	4.7 U g	4.7 U g	ND	NA	NA
2-MW-5	V2MW5	06-Feb-06		NA	4.7 U g	4.7 U g	ND	NA	NA
2-MW-7	V2MW7	06-Feb-06		0.29 g	4.9 U g	4.9 U g	ND	NA	NA
2-MW-8	V2MW8M	06-Feb-06		2.8 g	27 g	23 g	ND	21 g	ND
2-MW-9	V2MW9	06-Feb-06		0.02 U g	4.8 U g	4.8 U g	ND	NA	NA
OS-MW-1	VOSMW1	06-Feb-06		0.02 U g	4.7 U g	4.7 U g	ND	NA	NA
OS-MW-2	VOSMW2	06-Feb-06		0.02 U g	4.7 U g	4.7 U g	ND	0.2 UJ b	ND
OS-MW-2	V99W604 (D)	06-Feb-06		0.02 U g	4.9 U g	4.9 U g	ND	0.19 UJ b	ND

Data Validity Qualifier(s):

U - The analyte was not detected at or above the MDL.
UJ - The analyte was not detected above the MDL; however, the MDL is uncertain and may be elevated above normal levels.

Data Validity Comment(s):

b - The surrogate spike recovery was outside quality control criteria.
g - The data met prescribed criteria as detailed in the QAPP.

Definition(s):

(D) - duplicate sample
MDL - method detection limit
mg/L - milligrams per liter
µg/L - micrograms per liter
N/A - not applicable
NA - not analyzed
ND - Not detected; result is less than the MCL.
PAH - polynuclear aromatic hydrocarbon
PQL - practical quantitation limit
QAPP - Quality Assurance Project Plan
SIM - selected ion monitoring
SVOC - semivolatile organic compound
TPH - total petroleum hydrocarbons

Note(s):

1 - Values from QAPP Addendum (Tetra Tech 2004a).

The California Department of Health Services notification level for naphthalene is 17 µg/L.

Table 6
Summary of BGMP Key Contaminants of Concern
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

Benzene (µg/L)[a]

	Dec-99	Fall-00	Win-01	Spr-01	Sum-01	Fall-01	Win-02[i]	Spr-02	Sum-02	Fall-02	Win-03	Spr-03
2-MW-1	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA
2-MW-3	0.0465	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA
2-MW-5	0.0675	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-6	0.0445	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA	NA
2-MW-7	ND	ND	ND	ND	ND	ND	ND	NA	0.69	NA	ND	NA
2-MW-8	0.375	**3.5**	**4.4**	NA	**5.1**	**5.3**	**36**	**7.7**	**23**	**18**	**26**	**32.5**
2-MW-9	0.0485	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-10	0.0472	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-11	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA
2-MW-12	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA
OS-MW-1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
OS-MW-2	NA	NA	NA	ND	ND	ND	ND	NA	ND	NA	ND	NA

	Sum-03	Fall-03	Win-04	Spr-04	Sum-04	Fall-04	Win-05	Spr-05	Sum-05	Fall-05	Win-06
2-MW-1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-3	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	NA
2-MW-5	ND	NA	ND	NA	ND	NA	NA	NA	NA	NA	NA
2-MW-6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-7	0.23	NA	0.32	NA	0.45	NA	NA	NA	**1.5**	NA	**1.7**
2-MW-8	**22.5**	**33**	**33.8**	**22**	**21**	**39**	**57**	**36**	**37**	**35**	**67**
2-MW-9	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	ND
2-MW-10	ND	NA	ND	NA	ND	NA	NA	NA	NA	NA	NA
2-MW-11	ND	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA
2-MW-12	ND	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA
OS-MW-1	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND
OS-MW-2	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	ND

Table 6
Summary of BGMP Key Contaminants of Concern
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

	Toluene (µg/L)[a]											
	Dec-99	**Fall-00**	**Win-01**	**Spr-01**	**Sum-01**	**Fall-01**	**Win-02[i]**	**Spr-02**	**Sum-02**	**Fall-02**	**Win-03**	**Spr-03**
2-MW-1	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA
2-MW-3	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA
2-MW-5	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-6	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA	NA
2-MW-7	ND	ND	ND	0.64	ND	ND	ND	NA	2.2	NA	1.2	NA
2-MW-8	2.06	5.3	11	NA	11	6.4	64	12	35	23	37	22.7
2-MW-9	ND	ND	ND	0.59	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-10	ND	ND	ND	0.53	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-11	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA
2-MW-12	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA
OS-MW-1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
OS-MW-2	NA	NA	NA	ND	ND	ND	ND	NA	ND	NA	ND	NA

	Sum-03	**Fall-03**	**Win-04**	**Spr-04**	**Sum-04**	**Fall-04**	**Win-05**	**Spr-05**	**Sum-05**	**Fall-05**	**Win-06**
2-MW-1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-3	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	NA
2-MW-5	0.44	NA	ND	NA	ND	NA	NA	NA	NA	NA	NA
2-MW-6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-7	0.17	NA	ND	NA	ND	NA	NA	NA	0.74	NA	0.8
2-MW-8	12.1	24.1	9.98	6.7	5.5	8.9	11	8.7	7.7	7.5	21
2-MW-9	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	ND
2-MW-10	ND	NA	ND	NA	ND	NA	NA	NA	NA	NA	NA
2-MW-11	ND	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA
2-MW-12	ND	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA
OS-MW-1	0.4	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND
OS-MW-2	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	ND

Table 6
Summary of BGMP Key Contaminants of Concern
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

Ethylbenzene (µg/L)[a]

	Dec-99	Fall-00	Win-01	Spr-01	Sum-01	Fall-01	Win-02[i]	Spr-02	Sum-02	Fall-02	Win-03	Spr-03
2-MW-1	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA
2-MW-3	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA
2-MW-5	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-6	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA	NA
2-MW-7	ND	ND	ND	ND	ND	ND	ND	NA	2.4	NA	1.7	NA
2-MW-8	1.38	5.2	10	NA	8.7	4.9	62	12	37	31	36	34.7
2-MW-9	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-10	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-11	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA
2-MW-12	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA
OS-MW-1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
OS-MW-2	NA	NA	NA	ND	ND	ND	ND	NA	ND	NA	ND	NA

	Sum-03	Fall-03	Win-04	Spr-04	Sum-04	Fall-04	Win-05	Spr-05	Sum-05	Fall-05	Win-06
2-MW-1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-3	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	NA
2-MW-5	ND	NA	0.20	NA	ND	NA	NA	NA	NA	NA	NA
2-MW-6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-7	0.1	NA	0.14	NA	0.29	NA	NA	NA	1.3	NA	2.2
2-MW-8	32.3	26.9	34.1	20	19	34	39	26	22	30	56
2-MW-9	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	ND
2-MW-10	ND	NA	ND	NA	ND	NA	NA	NA	NA	NA	NA
2-MW-11	ND	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA
2-MW-12	ND	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA
OS-MW-1	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND
OS-MW-2	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	ND

Table 6
Summary of BGMP Key Contaminants of Concern
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

m,p-Xylenes (µg/L)[b]

	Dec-99	Fall-00	Win-01	Spr-01	Sum-01	Fall-01	Win-02[i]	Spr-02	Sum-02	Fall-02	Win-03	Spr-03
2-MW-1	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA
2-MW-3	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA
2-MW-5	0.316	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-6	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA	NA
2-MW-7	ND	4.6	ND	ND	ND	ND	ND	NA	22	NA	17	NA
2-MW-8	6.26	29	42	NA	37	37	250	61	160	72	180	230
2-MW-9	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-10	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-11	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA
2-MW-12	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA
OS-MW-1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
OS-MW-2	NA	NA	NA	ND	ND	ND	ND	NA	ND	NA	ND	NA

	Sum-03	Fall-03	Win-04	Spr-04	Sum-04	Fall-04	Win-05	Spr-05	Sum-05	Fall-05	Win-06
2-MW-1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-3	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	NA
2-MW-5	ND	NA	ND	NA	ND	NA	NA	NA	NA	NA	NA
2-MW-6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-7	7.88	NA	8.08	NA	11	NA	NA	NA	31	NA	30
2-MW-8	125	227	218	110	90	190	240	160	53	160	290
2-MW-9	0.17	NA	ND	NA	ND	NA	NA	NA	ND	NA	ND
2-MW-10	ND	NA	ND	NA	ND	NA	NA	NA	NA	NA	NA
2-MW-11	ND	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA
2-MW-12	ND	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA
OS-MW-1	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND
OS-MW-2	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	ND

Table 6
Summary of BGMP Key Contaminants of Concern
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

	o-Xylene (µg/L)[b]											
	Dec-99	**Fall-00**	**Win-01**	**Spr-01**	**Sum-01**	**Fall-01**	**Win-02[i]**	**Spr-02**	**Sum-02**	**Fall-02**	**Win-03**	**Spr-03**
2-MW-1	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA
2-MW-3	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA
2-MW-5	0.114	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-6	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA	NA
2-MW-7	ND	ND	ND	ND	ND	ND	4.9	NA	8.6	NA	6.4	NA
2-MW-8	2.21	6	14	NA	12	10	74	21	53	35	52	56.2
2-MW-9	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-10	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-11	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA
2-MW-12	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA
OS-MW-1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
OS-MW-2	NA	NA	NA	ND	ND	ND	ND	NA	ND	NA	ND	NA

	Sum-03	**Fall-03**	**Win-04**	**Spr-04**	**Sum-04**	**Fall-04**	**Win-05**	**Spr-05**	**Sum-05**	**Fall-05**	**Win-06**
2-MW-1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-3	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	NA
2-MW-5	ND	NA	ND	NA	ND	NA	NA	NA	NA	NA	NA
2-MW-6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-7	2.59	NA	2.97	NA	4.3	NA	NA	NA	11	NA	11
2-MW-8	24.7	61.6	48.7	28	28	48	51	42	41	40	71
2-MW-9	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	ND
2-MW-10	ND	NA	ND	NA	ND	NA	NA	NA	NA	NA	NA
2-MW-11	ND	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA
2-MW-12	ND	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA
OS-MW-1	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND
OS-MW-2	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	ND

Table 6
Summary of BGMP Key Contaminants of Concern
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

	TPH as gasoline (mg/L)											
	Dec-99	**Fall-00**	**Win-01**	**Spr-01**	**Sum-01**	**Fall-01**	**Win-02[i]**	**Spr-02**	**Sum-02**	**Fall-02**	**Win-03**	**Spr-03**
2-MW-1	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA
2-MW-3	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA
2-MW-5	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA
2-MW-6	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA
2-MW-7	ND	0.11	ND	ND	ND	ND	0.27	NA	0.25	NA	0.15	NA
2-MW-8	0.0719	0.69	0.62	NA	0.88	0.64	4.9	1.2	2.8	2.3	3.6	2.72
2-MW-9	ND	ND	ND	ND	ND	ND	NA	NA	ND	NA	ND	NA
2-MW-10	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA
2-MW-11	NA	NA	NA	ND	ND	ND	ND	ND	NA	NA	NA	NA
2-MW-12	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA
OS-MW-1	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
OS-MW-2	NA	NA	NA	ND	ND	ND	ND	NA	ND	NA	ND	NA

	Sum-03	**Fall-03**	**Win-04**	**Spr-04**	**Sum-04**	**Fall-04**	**Win-05**	**Spr-05**	**Sum-05**	**Fall-05**	**Win-06**
2-MW-1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-3	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-7	0.09	NA	0.09[c]	NA	0.1	NA	NA	NA	0.2	NA	0.29
2-MW-8	2.12	2.27	2.55	1.5	1.2	2.3	NA	NA	1.4	NA	2.8
2-MW-9	ND	NA	0.02[c]	NA	ND	NA	NA	NA	ND	NA	ND
2-MW-10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
OS-MW-1	ND	NA	0.02[c]	NA	ND	NA	NA	NA	ND	NA	ND
OS-MW-2	ND	NA	0.03[c]	NA	ND	NA	ND	NA	ND	NA	ND

Table 6
Summary of BGMP Key Contaminants of Concern
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

	Naphthalene (µg/L)											
	Dec-99	**Fall-00**	**Win-01**	**Spr-01**	**Sum-01**	**Fall-01**	**Win-02[i]**	**Spr-02**	**Sum-02**	**Fall-02**	**Win-03**	**Spr-03**
2-MW-1	0.124	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-3	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA
2-MW-5	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-6	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA
2-MW-7	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-8	1.07	ND	ND	NA	5.3	ND	21	10	18	12	16	15.2
2-MW-9	0.205	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-10	0.137	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA
2-MW-11	NA	NA	NA	ND	ND	ND	ND	ND	NA	NA	NA	NA
2-MW-12	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA
OS-MW-1	ND	ND	ND	ND	ND	ND	ND	NA	ND	ND	ND	NA
OS-MW-2	NA	NA	NA	ND	ND	ND	ND	NA	ND	NA	ND	NA

	Sum-03	**Fall-03**	**Win-04**	**Spr-04**	**Sum-04**	**Fall-04**	**Win-05**	**Spr-05**	**Sum-05**	**Fall-05**	**Win-06**
2-MW-1	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-3	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-5	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND
2-MW-7	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-8	18.5	25.7	28.8	9.7	9.2	21	17	22	16	12	23
2-MW-9	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
OS-MW-1	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
OS-MW-2	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND

Table 6
Summary of BGMP Key Contaminants of Concern
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

	Dissolved Aluminum (µg/L)[d]											
	Dec-99	**Fall-00**	**Win-01**	**Spr-01**	**Sum-01**	**Fall-01**	**Win-02[i]**	**Spr-02**	**Sum-02**	**Fall-02**	**Win-03**	**Spr-03**
2-MW-1	NA	238	380	293	ND	464	662	NA	288	NA	ND	NA
2-MW-3	NA	ND	ND	ND	ND	ND	ND	118	ND	NA	ND	NA
2-MW-5	NA	ND	ND	ND	ND	ND	209	NA	ND	NA	ND	NA
2-MW-6	NA	399	ND	ND	ND	229	678	NA	374	NA	NA	NA
2-MW-7	NA	470	373	423	408	666	**1,180**	NA	200	NA	475	NA
2-MW-8	NA	**1,380**	**1,260**	NA	**1,650**	**1,970**	**13,500**	**12,700**	**12,300**	**3,970**	**7,410**	**8,600**
2-MW-9	NA	ND	ND	268	ND	483	548	NA	ND	NA	265	NA
2-MW-10	NA	ND	ND	ND	232	277	651	NA	341	NA	622	NA
2-MW-11	NA	NA	NA	ND	ND	ND	341	242	ND	ND	ND	33.2[c]
2-MW-12	NA	NA	NA	ND	ND	ND	284	186	ND	ND	ND	26.6[c]
OS-MW-1	NA	ND	ND	ND	ND	ND	313	NA	ND	NA	ND	NA
OS-MW-2	NA	NA	NA	ND	ND	ND	211	NA	ND	NA	ND	NA

	Sum-03	**Fall-03**	**Win-04**	**Spr-04**	**Sum-04**	**Fall-04**	**Win-05**	**Spr-05**	**Sum-05**	**Fall-05**	**Win-06**
2-MW-1	383	NA	464	NA	408	NA	386	NA	445	NA	413
2-MW-3	ND	NA	17.8	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-5	ND	NA	21.9	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-7	519	NA	224	NA	574	NA	662	NA	543	NA	652
2-MW-8	**8,320**	**9,300**	**6,880**	**5,330**	**5,100**	**5,420**	**5,070**	**5,430**	**5,060**	**4,960**	**5,750**
2-MW-9	284	NA	132	NA	ND	NA	104	NA	61.5	NA	ND
2-MW-10	939	NA	505	NA	213	NA	521	NA	ND	NA	74.7
2-MW-11	NA	26.2	23	NA	ND	ND	ND	ND	ND	ND	ND
2-MW-12	NA	33.6	19	NA	ND	ND	ND	ND	ND	ND	ND
OS-MW-1	42.8	NA	44.6	NA	ND	NA	ND	NA	ND	NA	ND
OS-MW-2	20.1	NA	26.9	NA	ND	NA	ND	NA	ND	NA	ND

Table 6
Summary of BGMP Key Contaminants of Concern
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

	Dissolved Beryllium (µg/L)[e]											
	Dec-99	**Fall-00**	**Win-01**	**Spr-01**	**Sum-01**	**Fall-01**	**Win-02[i]**	**Spr-02**	**Sum-02**	**Fall-02**	**Win-03**	**Spr-03**
2-MW-1	NA	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-3	NA	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA
2-MW-5	NA	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-6	NA	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA	NA
2-MW-7	NA	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-8	NA	ND	ND	NA	ND	ND	**12.7**	**13.1**	**12.2**	**7.02**	**11.3**	**10.3**
2-MW-9	NA	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-10	NA	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-11	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-MW-12	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
OS-MW-1	NA	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
OS-MW-2	NA	NA	NA	ND	ND	ND	ND	NA	ND	NA	ND	NA

	Sum-03	**Fall-03**	**Win-04**	**Spr-04**	**Sum-04**	**Fall-04**	**Win-05**	**Spr-05**	**Sum-05**	**Fall-05**	**Win-06**
2-MW-1	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-3	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-5	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-7	1.5	NA	ND	NA	2.43	NA	1.64	NA	1.71	NA	1.62
2-MW-8	**10**	**10.9**	**9.8**	**8.42**	**8.25**	**7.79**	**7.47**	**7.82**	**6.81**	**7.14**	**7.68**
2-MW-9	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-10	2.7	NA	1.7	NA	ND	NA	1.5	NA	ND	NA	ND
2-MW-11	NA	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND
2-MW-12	NA	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND
OS-MW-1	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
OS-MW-2	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND

Table 6
Summary of BGMP Key Contaminants of Concern
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

Dissolved Cadmium (µg/L)[f]

	Dec-99	Fall-00	Win-01	Spr-01	Sum-01	Fall-01	Win-02[i]	Spr-02	Sum-02	Fall-02	Win-03	Spr-03
2-MW-1	10.8	55.4	12.4	12.7	10.2	12.4	11.1	NA	10.7	NA	79.6	NA
2-MW-3	2.32	12	ND	4.13	6.6	2.05	5.84	7	5.98	NA	4.17	NA
2-MW-5	ND	4.9	298	141	59.3	137	4.74	NA	13.6	NA	6.68	NA
2-MW-6	4.31	ND	41	20.5	8.96	30.2	5.22	NA	4.66	NA	NA	NA
2-MW-7	2.79	4.4	6.39	6.62	6.78	29.7	17.5	NA	1.94	NA	8.63	NA
2-MW-8	22.4	6.74	35.2	NA	34	38.7	35	37	34.8	26.4	38.9	41.6
2-MW-9	42.3	34	74.5	76.5	81.1	96	72.1	NA	73.4	NA	12.4	NA
2-MW-10	60.2	80.4	78.8	76.3	77.4	88.1	71.8	NA	87.5	NA	11.3	NA
2-MW-11	NA	NA	NA	5.87	5.39	7.18	4.33	5.11	5.8	4.56	5.74	5
2-MW-12	NA	NA	NA	36.3	36.1	31.6	ND	12.7	17.4	ND	8.12	1.9
OS-MW-1	38.1	85.6	54.7	54.5	50.8	60.5	46.6	NA	58.8	NA	63.2	NA
OS-MW-2	NA	NA	NA	6.82	13.9	2.56	10.9	NA	10.3	NA	10.4	NA

	Sum-03	Fall-03	Win-04	Spr-04	Sum-04	Fall-04	Win-05	Spr-05	Sum-05	Fall-05	Win-06
2-MW-1	13.1	NA	14.1	NA	12	NA	11	NA	14	NA	11.8
2-MW-3	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-5	4.5	NA	3.4	NA	14.1	NA	4.96	NA	5.49	NA	3.74
2-MW-6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-7	7.6	NA	6.8	NA	10.3	NA	7.06	NA	7.63	NA	7.93
2-MW-8	39.8	38.9	39.6	40.5	40.2	39.5	39.5	36.8	37.6	33.9	35
2-MW-9	85.8	NA	83.5	NA	84.4	NA	87.2	NA	86.1	NA	84.8
2-MW-10	59.7	NA	69.9	NA	64.5	NA	71.3	NA	ND	NA	28.8
2-MW-11	NA	6.5	4.9	NA	4.59	7.1	8.21	3.2	7.74	3.69	5
2-MW-12	NA	ND	ND	NA	ND	ND	ND	ND	2.07	ND	ND
OS-MW-1	64.7	NA	73.8	NA	64.9	NA	72.3	NA	64	NA	52.3
OS-MW-2	9.8	NA	5.2	NA	2.25	NA	2.52	NA	3.84	NA	3.39

Table 6
Summary of BGMP Key Contaminants of Concern
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

Dissolved Selenium (µg/L)[g]

	Dec-99	Fall-00	Win-01	Spr-01	Sum-01	Fall-01	Win-02[i]	Spr-02	Sum-02	Fall-02	Win-03	Spr-03
2-MW-1	NA	39.8	35.8	32.4	37.6	43.8	32	NA	23.9	NA	**127**	NA
2-MW-3	NA	ND	ND	ND	ND	ND	ND	ND	ND	NA	23.1	NA
2-MW-5	NA	ND	ND	14.9	7.08	10.7	ND	NA	ND	NA	47.6	NA
2-MW-6	NA	31.9	29.8	28.5	35.9	6.83	30.1	NA	ND	NA	NA	NA
2-MW-7	NA	35.1	28.8	34.2	31.2	46.1	31.3	NA	22.3	NA	**63.1**	NA
2-MW-8	NA	37.7	36.3	NA	37.5	43.2	ND	35.2	ND	21.3	**88.0**	26.7
2-MW-9	NA	43.4	37.5	40.3	42.0	47.8	31.1	NA	31.2	NA	**88.6**	NA
2-MW-10	NA	23.5	14.3	20.9	32.3	27.4	22.6	NA	9.67	NA	20.8	NA
2-MW-11	NA	NA	NA	25.3	24.1	25.2	25.8	**55**	23.7	**87.5**	**148**	36.3
2-MW-12	NA	NA	NA	ND	ND	ND	ND	ND	ND	40.7	**52.1**	ND
OS-MW-1	NA	14.8	9.11	16.3	15.8	13.6	ND	NA	ND	NA	**58.3**	NA
OS-MW-2	NA	NA	NA	10.7	13.6	ND	ND	NA	ND	NA	34.4	NA

	Sum-03	Fall-03	Win-04	Spr-04	Sum-04	Fall-04	Win-05	Spr-05	Sum-05	Fall-05	Win-06
2-MW-1	42.9	NA	35	NA	40.1	NA	39.4	NA	45.7	NA	41.7
2-MW-3	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-5	**62.6**	NA	16.9	NA	17.6	NA	25	NA	24.8	NA	21.2
2-MW-6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-7	**57.5**	NA	27.2	NA	37.3	NA	37	NA	35.8	NA	33
2-MW-8	43.1	30.7	26.2	35.9	32.2	39.4	41	39.4	40.7	36.6	38.1
2-MW-9	**56.7**	NA	33.4	NA	44.7	NA	48.3	NA	48.3	NA	46.8
2-MW-10	23.9	NA	21.1	NA	24.1	NA	28.8	NA	ND	NA	7.46
2-MW-11	NA	36.3	38.6	NA	42.8	44.1	45.7	45.6	46	40.8	41.9
2-MW-12	NA	3.3	ND	NA	ND	ND	ND	ND	ND	ND	ND
OS-MW-1	18	NA	17.1	NA	15.2	NA	13.3	NA	13.5	NA	6.99
OS-MW-2	12.3	NA	8.3	NA	15.9	NA	6.56	NA	7.79	NA	11.4

Table 6
Summary of BGMP Key Contaminants of Concern
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Vandenberg AFB, California

	Dissolved Thallium (µg/L)[h]											
	Dec-99	**Fall-00**	**Win-01**	**Spr-01**	**Sum-01**	**Fall-01**	**Win-02[i]**	**Spr-02**	**Sum-02**	**Fall-02**	**Win-03**	**Spr-03**
2-MW-1	NA	ND	ND	ND	ND	66.6	ND	NA	ND	NA	ND	NA
2-MW-3	NA	ND	ND	ND	ND	44.9	ND	ND	ND	NA	ND	NA
2-MW-5	NA	ND	ND	ND	ND	90.0	ND	NA	ND	NA	ND	NA
2-MW-6	NA	ND	ND	ND	ND	35.9	ND	NA	ND	NA	NA	NA
2-MW-7	NA	ND	ND	ND	ND	59.9	ND	NA	ND	NA	ND	NA
2-MW-8	NA	ND	ND	NA	ND	76.9	ND	ND	ND	14.8	ND	ND
2-MW-9	NA	ND	ND	ND	ND	78.4	ND	NA	ND	NA	ND	NA
2-MW-10	NA	ND	ND	ND	ND	71.1	ND	NA	ND	NA	ND	NA
2-MW-11	NA	NA	NA	ND	ND	66.1	ND	ND	ND	ND	ND	ND
2-MW-12	NA	NA	NA	ND	ND	69.7	ND	ND	ND	ND	ND	ND
OS-MW-1	NA	ND	ND	ND	ND	65.2	ND	NA	ND	NA	ND	NA
OS-MW-2	NA	NA	NA	ND	ND	38.5	ND	NA	ND	NA	ND	NA

	Sum-03	**Fall-03**	**Win-04**	**Spr-04**	**Sum-04**	**Fall-04**	**Win-05**	**Spr-05**	**Sum-05**	**Fall-05**	**Win-06**
2-MW-1	ND	NA	1.30	NA	7.55	NA	7.62	NA	9.77	NA	ND
2-MW-3	ND	NA	ND	NA	6.03	NA	ND	NA	ND	NA	ND
2-MW-5	ND	NA	ND	NA	5.88	NA	ND	NA	7.01	NA	ND
2-MW-6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-7	ND	NA	ND	NA	9.7	NA	9.98	NA	5.48	NA	ND
2-MW-8	ND	ND	ND	ND	10.1	8.01	ND	7.55	ND	6.27	ND
2-MW-9	ND	NA	1.10	NA	10.6	NA	ND	NA	6.26	NA	ND
2-MW-10	ND	NA	ND	NA	ND	NA	6.44	NA	7.44	NA	ND
2-MW-11	NA	ND	1.40	NA	6.17	ND	8.56	11.1	6.03	6.69	ND
2-MW-12	NA	ND	1.80	NA	ND	ND	ND	5.5	5.99	7.28	ND
OS-MW-1	ND	NA	0.85	NA	ND	NA	ND	NA	ND	NA	ND
OS-MW-2	ND	NA	1.30	NA	ND	NA	ND	NA	ND	NA	ND

Table 6
Summary of BGMP Key Contaminants of Concern
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

Definition(s):

BTV	background threshold value
MCL	maximum contaminant level
µg/L	micrograms per liter
mg/L	milligrams per liter
NA	not analyzed
ND	Not detected; result is less than the method detection limit.
TPH	total petroleum hydrocarbons

Note(s):

Bold type indicates results that were above the MCL.

Shading indicates results that were above the 95th percentile BTV.

a	The MCLs for benzene, toluene, and ethylbenzene are 1, 150, and 300 µg/L, respectively.
b	The MCL of 1,750 µg/L applies to the sum of *m*-xylene, *o*-xylene, and *p*-xylene.
c	The data were qualified for blank contamination during the validation process. The laboratory method blank showed the same order of magnitude as the sample results. The sample results are strongly suspected to be false positive.
d	The BTV and MCL for aluminum are 1,200 and 1,000 µg/L, respectively.
e	The BTV and MCL for beryllium are 0.3 and 4 µg/L, respectively.
f	The BTV and MCL for cadmium are both 5 µg/L.
g	The BTV and MCL for selenium are 3 and 50 µg/L, respectively.
h	The BTV and MCL for thallium are 1 and 2 µg/L, respectively.
i	Dedicated MicroPurge pumps were installed in Site 2 wells during winter 2002.

APPENDIX A PURGE RECORDS

TETRA TECH, INC.
4213 State Street, STE 100
Santa Barbara, CA 93110
Telephone (805) 681-3100
Telefax (805) 681-3108

GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

DATE 02/06/06 SITE NUMBER 2

PROGRAM NAME BGMP TRIP BLANK I.D. ~~V2TB171~~ (MW)

MONITORING WELL IDENTIFICATION 2-MW-1

SAMPLE I.D. V2MW1 DUPLICATE I.D. / COLLECTION TIME V99W603/1710

STATIC WATER LEVEL (ft btoc) 14.84 TOTAL WELL DEPTH (ft btoc) 36.3

WATER COLUMN (feet) 21.5 TUBING DIAMETER (in) 3/8

PUMP & TUBING (V) (L) 0.68 5 V (L) 3.40

PURGING DEVICE MICROPURGE DEDICATED PUMP

SAMPLING DEVICE MICROPURGE DEDICATED PUMP

PID READING IN CASING (ppm) (initial) 0.0 (vented to) 0.0

PID READING IN BREATHING ZONE (ppm) (initial) 0.0 (vented to) 0.0

SAMPLER'S SIGNATURE

Time	Activity	Water Level (ft btoc)	Temp (Deg. C)	EC (µmhos/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (mg/L)	ORP (mV)	Color	Volume Purged (L)	Pump & Tubing Volumes Purged	Flow Rate (LPM)
1500	Arrived at well											
1510	Begin Purge											0.30
1513		14.95	12.46	10171	5.39	32.9	2.30	-51.0	clear	0.90	1.32	
1516		15.00	17.23	10295	5.39	28.6	1.15	-43.2	clear	1.80	2.64	
1519		15.00	17.12	10292	5.38	25.7	0.86	-39.8	Clear	2.70	3.96	
1522		15.00	17.10	10291	5.35	25.3	0.67	-33.7	clear	3.60	5.28	
1523	END Purge	~~15.00~~										
1525	SAMPLE											
1530	Vacated well											

Fe+2 (ppm) — Taken immediately before sampling.

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 15.00 FILTER LOT # A10425464

Comments:

PARAMETERS FOR WATER QUALITY STABILIZATION

Temperature ±1 C (1.8 F)	Conductivity ± 5%
pH ± 0.1	Turbidity 5 NTUs

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be periodically monitored during purging and sampling activities.

Form number Tt-O-049 (9/05)

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TETRA TECH, INC.
4213 State Street, STE 100
Santa Barbara, CA 93110
Telephone (805) 681-3100
Telefax (805) 681-3108

GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

DATE 02/06/06 SITE NUMBER 2 PURGING DEVICE MICROPURGE DEDICATED PUMP

PROGRAM NAME BGMP TRIP BLANK I.D. ~~V27B-1171~~ (EW) SAMPLING DEVICE MICROPURGE DEDICATED PUMP

MONITORING WELL IDENTIFICATION 2-MW-3 PID READING IN CASING (ppm) (initial) 0.2 (vented to) 0.0

SAMPLE I.D. V2MW3 DUPLICATE I.D. / COLLECTION TIME — / — PID READING IN BREATHING ZONE (ppm) (initial) 0.0 (vented to) 0.0

STATIC WATER LEVEL (ft btoc) 30.60 TOTAL WELL DEPTH (ft btoc) 63.8

WATER COLUMN (feet) 33.2 TUBING DIAMETER (in) 3/8 SAMPLER'S SIGNATURE [signature]

PUMP & TUBING (V) (L) 0.95 5 V (L) 4.75

Time	Activity	Water Level (ft btoc)	Temp (Deg. C)	EC (µmhos/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (mg/L)	ORP (mV)	Color	Volume Purged (L)	Pump & Tubing Volumes Purged	Flow Rate (LPM)
0940	Arrived at well											
0954	Begin Purge											0.21
0958		30.71	18.07	5689	6.75	3.21	1.11	-348	clear	0.84	0.88	
1002		30.72	18.23	5710	6.57	2.54	0.81	25.9	clear	1.68	1.76	
1006		30.72	18.38	5730	6.47	1.81	0.74	22.6	clear	2.52	2.65	
1010		30.72	18.44	5739	6.41	1.67	0.59	21.4	clear	3.68	3.87	
1014		30.72	18.51	5750	6.39	2.14	0.58	19.7	clear	4.20	4.42	
1015	END PURGE											
1020	SAMPLE											
1045	Vacated well											

Fe+2 (ppm) — Taken immediately before sampling.

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 30.72 FILTER LOT # A1042464

Comments:

PARAMETERS FOR WATER QUALITY STABILIZATION

Temperature ±1 C (1.8 F)	Conductivity ± 5%
pH ± 0.1	Turbidity 5 NTUs

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be periodically monitored during purging and sampling activities.

Form number Tt-O-049 (9/05)

TETRA TECH, INC.
4213 State Street, STE 100
Santa Barbara, CA 93110
Telephone (805) 681-3100
Telefax (805) 681-3108

GROUNDWATER MONITORING WELL FIELD DATA LOG SHEET - PURGING

DATE 2/6/06 SITE NUMBER 2
PROGRAM NAME BGMP TRIP BLANK I.D. ~~[illegible]~~ (MB)
MONITORING WELL IDENTIFICATION 2-MW-5
SAMPLE I.D. V2MW5 DUPLICATE I.D. / COLLECTION TIME — / —
STATIC WATER LEVEL (ft btoc) 21.30 TOTAL WELL DEPTH (ft btoc) 44.4
WATER COLUMN (feet) 23.1 TUBING DIAMETER (in) 3/8
PUMP & TUBING (V) (L) 2.49 5 V (L) 12.45

PURGING DEVICE MICROPURGE DEDICATED PUMP
SAMPLING DEVICE MICROPURGE DEDICATED PUMP
PID READING IN CASING (ppm) (initial) — (vented to) —
PID READING IN BREATHING ZONE (ppm) (initial) — (vented to) —
SAMPLER'S SIGNATURE [signature] [signature]

Time	Activity	Water Level (ft btoc)	Temp (Deg. C)	EC (µmhos/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (mg/L)	ORP (mV)	Color	Volume Purged (L)	Pump & Tubing Volumes Purged	Flow Rate (LPM)
1156	Arrived at well	—	—	—	—	—	—	—	—	—	—	—
1204	Begin Purge	—	—	—	—	—	—	—	—	—	—	0.22
1209		21.95	12.28	6207	6.28	1.54	9.62	126.0	Clear	1.10	0.44	
1214		22.16	12.24	6759	6.07	3.99	3.45	78.6	Clear	2.20	0.88	
1219		22.16	12.30	6981	6.06	3.04	3.02	88.2	Clear	3.30	1.33	
1224		22.09	12.48	7168	6.05	3.22	2.85	100.4	Clear	4.40	1.77	
1229		22.02	12.56	7273	6.05	1.93	2.79	108.5	Clear	5.50	2.21	
1230	End Purge											
1235	Sample											
1245	Vacated well	—	—	—	—	—	—	—	—	—	—	—

Fe+2 (ppm) — Taken immediately before sampling.
WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 21.96 FILTER LOT # A10425464
Comments: BID: 32.77
Transducer reads 137.65 = 11.47'

32.77
−11.47
21.30

PARAMETERS FOR WATER QUALITY STABILIZATION
Temperature ±1 C (1.8 F) Conductivity ±5%
pH ±0.1 Turbidity 5 NTUs

Read transducer + divide reading by 12 to give you feet.

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be periodically monitored during purging and sampling activities.

TETRA TECH, INC.
4213 State Street, STE 100
Santa Barbara, CA 93110
Telephone (805) 681-3100
Telefax (805) 681-3108

GROUNDWATER MONITORING WELL FIELD DATA LOG SHEET - PURGING

DATE 2/6/06 SITE NUMBER 2

PROGRAM NAME BGMP TRIP BLANK I.D. V2TB471

MONITORING WELL IDENTIFICATION 2-MW-7

SAMPLE I.D. V2MW7 DUPLICATE I.D. / COLLECTION TIME — / —

STATIC WATER LEVEL (ft btoc) 22.43* TOTAL WELL DEPTH (ft btoc) 39.4

WATER COLUMN (feet) 17.0 TUBING DIAMETER (in) 3/8

PUMP & TUBING (V) (L) 2.00 5 V (L) 10.00

PURGING DEVICE MICROPURGE DEDICATED PUMP

SAMPLING DEVICE MICROPURGE DEDICATED PUMP

PID READING IN CASING (ppm) (initial) — (vented to) —

PID READING IN BREATHING ZONE (ppm) (initial) — (vented to) —

SAMPLER'S SIGNATURE [signatures]

Time	Activity	Water Level (ft btoc)	Temp (Deg. C)	EC (µmhos/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (mg/L)	ORP (mV)	Color	Volume Purged (L)	Pump & Tubing Volumes Purged	Flow Rate (LPM)
1410	Arrived at well	—	—	—	—	—	—	—	—	—	—	—
1415	Begin Purge	—	—	—	—	—	—	—	—	—	—	0.18
1420		22.36	13.09	9112	5.37	0.86	3.75	162.7	Clear	0.90	0.45	↓
1425		22.68	13.61	9236	5.35	0.39	3.05	166.5	Clear	1.80	0.90	↓
1430		23.21	13.81	8756	5.74	0.82	2.85	146.1	Clear	2.70	1.35	↓
1435		23.57	13.82	8646	5.84	0.84	2.66	138.8	Clear	3.60	1.80	↓
1440		23.91	13.90	8645	5.84	1.01	2.54	136.0	Clear	4.50	2.25	↓
1441	End Purge											
1445	Sample											
1455	Vacated well	—	—	—	—	—	—	—	—	—	—	—

Fe+2 (ppm) — Taken immediately before sampling.

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 24.43 FILTER LOT # A10425464

PARAMETERS FOR WATER QUALITY STABILIZATION

Temperature ±1 C (1.8 F)	Conductivity ±5%
pH ±0.1	Turbidity 5 NTUs

Comments: BIOF 30.46 | 30.46

Transducer reads: 96.36 ÷ 8.03' | - 8.03 | 22.43' | ADD: 24.85

Read Transducer + divide reading by twelve to get feet

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be periodically monitored during purging and sampling activities.

TETRA TECH, INC.
4213 State Street, STE 100
Santa Barbara, CA 93110
Telephone (805) 681-3100
Telefax (805) 681-3108

GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

DATE 2/6/06 SITE NUMBER 2

PROGRAM NAME BLMP TRIP BLANK I.D. V2TB1171

MONITORING WELL IDENTIFICATION 2-MW-8

SAMPLE I.D. V2MW8M DUPLICATE I.D. / COLLECTION TIME - / -

STATIC WATER LEVEL (ft btoc) 33.39 TOTAL WELL DEPTH (ft btoc) 34.8

WATER COLUMN (feet) 11.5 TUBING DIAMETER (in) 3/8

PUMP & TUBING (V) (L) 1.48 5 V (L) 7.40

PURGING DEVICE MICROPURGE DEDICATED PUMP

SAMPLING DEVICE MICROPURGE DEDICATED PUMP

PID READING IN CASING (ppm) (initial) — (vented to) —

PID READING IN BREATHING ZONE (ppm) (initial) — (vented to) —

SAMPLER'S SIGNATURE

Time	Activity	Water Level (ft btoc)	Temp (Deg. C)	EC (µmhos/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (mg/L)	ORP (mV)	Color	Volume Purged (L)	Pump & Tubing Volumes Purged	Flow Rate (LPM)
1500	Arrived at well											
1506	Begin Purge											0.14
1511		33.80	13.16	11795	4.76	0.70	5.54	211.3	Clear	0.70	0.47	
1516		33.80	13.47	11871	4.70	0.13	3.77	215.4	Clear	1.40	0.95	
1521		33.84	13.82	12037	4.69	0.54	3.50	216.2	Clear	2.10	1.42	
1522	End Purge											
1525	Sample											
1600	Vacated well											

Fe+2 (ppm) — Taken immediately before sampling.

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 33.92 FILTER LOT # A1043547G4

PARAMETERS FOR WATER QUALITY STABILIZATION

Temperature ±1 C (1.8 F)	Conductivity ± 5%
pH ± 0.1	Turbidity 5 NTUs

Comments: BTD: 43.33 36.95 36.95

Transducer: 43.87 = 3.66' - 3.16

ADD: 34.43' btoc

Read Transducer + divide reading by 12 to get feet

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be periodically monitored during purging and sampling activities.

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TETRA TECH, INC.
4213 State Street, STE 100
Santa Barbara, CA 93110
Telephone (805) 681-3100
Telefax (805) 681-3108

GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

DATE 2/6/06 SITE NUMBER 2 PURGING DEVICE MICROPURGE DEDICATED PUMP

PROGRAM NAME BCMP TRIP BLANK I.D. V2TB1171 SAMPLING DEVICE MICROPURGE DEDICATED PUMP

MONITORING WELL IDENTIFICATION 2-MW-9 PID READING IN CASING (ppm) (initial) — (vented to) —

SAMPLE I.D. V2MW9 DUPLICATE I.D. / COLLECTION TIME —/— PID READING IN BREATHING ZONE (ppm) (initial) — (vented to) —

STATIC WATER LEVEL (ft btoc) 22.95 TOTAL WELL DEPTH (ft btoc) 45.2

WATER COLUMN (feet) 22.2 TUBING DIAMETER (in) 3/8 SAMPLER'S SIGNATURE

PUMP & TUBING (V) (L) 2.01 5 V (L) 10.05

Time	Activity	Water Level (ft btoc)	Temp (Deg. C)	EC (µmhos/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (mg/L)	ORP (mV)	Color	Volume Purged (L)	Pump & Tubing Volumes Purged	Flow Rate (LPM)
1250	Arrived at well	—	—	—	—	—	—	—	—	—	—	—
1258	Begin Purge	—	—	—	—	—	—	—	—	—	—	0.14
1303		23.61	13.20	10768	6.06	2.54	12.72	132.6	Clear	0.70	0.35	
1308		23.66	12.84	10831	6.44	1.47	12.61	130.9	Clear	1.40	0.70	
1313		23.81	12.86	10891	6.35	29.1	7.31	133.2	Clear	2.10	1.04	
1318		23.99	13.05	10999	5.98	10.1	5.49	139.2	Clear	2.80	1.39	
1323		24.09	13.22	11102	5.87	6.52	4.92	148.7	Clear	3.50	1.74	
1328		24.18	13.15	11097	5.79	4.99	4.69	154.1	Clear	4.20	2.09	
1333		24.27	13.15	11113	5.76	4.56	4.59	158.0	Clear	4.90	2.44	
1339		24.28	13.23	~~11102~~ 11163 (EM)	5.72	3.60	4.48	163.7	Clear	5.60	2.79	
1340	End Purge	—	—	—	—	—	—	—	—	—	—	—
1345	Sample	—	—	—	—	—	—	—	—	—	—	—
~~1350~~ (EM)												
1400	Vacated well	—	—	—	—	—	—	—	—	—	—	—

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Fe+2 (ppm) — Taken immediately before sampling.

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 24.22 FILTER LOT # A10425464

Comments: BIP: 34.11

34.11

Transducer: 139.90 = 11.11'

-11.16

22.95 = Static W.L.

Read transducer. Divide by twelve to give a foot.

PARAMETERS FOR WATER QUALITY STABILIZATION

Temperature ±1 C (1.8 F)	Conductivity ±5%
pH ±0.1	Turbidity 5 NTUs

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be periodically monitored during purging and sampling activities.

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GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

DATE 02/06/06 SITE NUMBER 2 PURGING DEVICE MICROPURGE DEDICATED PUMP

PROGRAM NAME BGMP TRIP BLANK I.D. ~~V2TB1171~~ SAMPLING DEVICE MICROPURGE DEDICATED PUMP

MONITORING WELL IDENTIFICATION 2-MW-10 PID READING IN CASING (ppm) (initial) 0.0 (vented to) 0.0

SAMPLE I.D. V2MW10F DUPLICATE I.D. / COLLECTION TIME - / - PID READING IN BREATHING ZONE (ppm) (initial) 0.0 (vented to) 0.0

STATIC WATER LEVEL (ft btoc) 27.54 TOTAL WELL DEPTH (ft btoc) 53.7

WATER COLUMN (feet) 26.2 TUBING DIAMETER (in) 3/8 SAMPLER'S SIGNATURE

PUMP & TUBING (V) (L) 0.87 5 V (L) ~~4.35~~ 4.35

Time	Activity	Water Level (ft btoc)	Temp (Deg. C)	EC (µmhos/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (mg/L)	ORP (mV)	Color	Volume Purged (L)	Pump & Tubing Volumes Purged	Flow Rate (LPM)
1110	Arrived at well	—	—	—	—	—	—	—	—	—	—	—
1126	Begin Purge	—	—	—	—	—	—	—	—	—	—	0.30
1129		28.46	19.07	8869	5.80	39.7	0.48	61.8	cloudy	0.90	1.03	↓
1132		28.74	18.86	9111	5.81	39.1	0.33	72.2	cloudy	1.80	2.07	
1135		28.92	18.88	9158	5.77	39.7	0.28	78.1	cloudy	2.70	3.10	
1138		29.17	18.78	9114	5.79	41.3	0.26	79.0	cloudy	3.60	4.14	
1141		29.34	18.78	9090	5.78	41.6	0.23	78.5	cloudy	4.50	5.17	↓
1142	END PURGE	—	—	—	—	—	—	—	—	—	—	—
1150	SAMPLE	—	—	—	—	—	—	—	—	—	—	—
1155	Vacated well	—	—	—	—	—	—	—	—	—	—	—

Fe+2 (ppm) — Taken immediately before sampling.

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 29.44 FILTER LOT # A1042546H

PARAMETERS FOR WATER QUALITY STABILIZATION
Temperature ±1 C (1.8 F) Conductivity ±5%
pH ±0.1 Turbidity 5 NTUs

Comments:

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be periodically monitored during purging and sampling activities.

Form number Tt-O-049 (9/05)

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TETRA TECH, INC.
4213 State Street, STE 100
Santa Barbara, CA 93110
Telephone (805) 681-3100
Telefax (805) 681-3108

GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

DATE 02/06/06 SITE NUMBER 2 PURGING DEVICE MICROPURGE DEDICATED PUMP

PROGRAM NAME BGMP TRIP BLANK I.D. ~~V2-TB11-1~~ (MW) SAMPLING DEVICE MICROPURGE DEDICATED PUMP

MONITORING WELL IDENTIFICATION 2-MW-11 PID READING IN CASING (ppm) (initial) 0.3 (vented to) 0.0

SAMPLE I.D. V2MW11F DUPLICATE I.D. / COLLECTION TIME -/- PID READING IN BREATHING ZONE (ppm) (initial) 0.0 (vented to) 0.0

STATIC WATER LEVEL (ft btoc) 30.98 TOTAL WELL DEPTH (ft btoc) 54.9

WATER COLUMN (feet) 23.9 TUBING DIAMETER (in) 3/8 SAMPLER'S SIGNATURE

PUMP & TUBING (V) (L) 0.87 5 V (L) 4.35

Time	Activity	Water Level (ft btoc)	Temp (Deg. C)	EC (µmhos/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (mg/L)	ORP (mV)	Color	Volume Purged (L)	Pump & Tubing Volumes Purged	Flow Rate (LPM)
1550	Arrived at well											
1557	Begin Purge											0.2
1600		31.43	17.70	11180	6.23	6.74	5.28	-0.2	Clear	0.6	0.69	
1603		31.61	17.79	11332	6.12	3.83	3.34	7.1	Clear	1.2	1.38	
1606		31.71	17.82	11379	6.07	3.19	2.24	9.8	Clear	1.8	2.07	
1609		31.94	17.80	11390	6.04	3.39	1.60	9.4	Clear	2.4	2.76	
1610	END PURGE											
1615	SAMPLE											
1625	Vacated well											

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Fe+2 (ppm) — Taken immediately before sampling.

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 31.96 FILTER LOT # A10425464

Comments:

PARAMETERS FOR WATER QUALITY STABILIZATION

Temperature ±1 C (1.8 F)	Conductivity ± 5%
pH ± 0.1	Turbidity 5 NTUs

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be periodically monitored during purging and sampling activities.

TETRA TECH, INC.
4213 State Street, STE 100
Santa Barbara, CA 93110
Telephone (805) 681-3100
Telefax (805) 681-3108

GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

DATE 02/06/06 SITE NUMBER 2 PURGING DEVICE MICROPURGE DEDICATED PUMP

PROGRAM NAME BGMP TRIP BLANK I.D. ~~V2TB117~~ (AG) SAMPLING DEVICE MICROPURGE DEDICATED PUMP

MONITORING WELL IDENTIFICATION 2-MW-12 PID READING IN CASING (ppm) (initial) 0.0 (vented to) 0.0

SAMPLE I.D. V2MW12F DUPLICATE I.D. / COLLECTION TIME -/- PID READING IN BREATHING ZONE (ppm) (initial) 0.0 (vented to) 0.0

STATIC WATER LEVEL (ft btoc) 27.45 TOTAL WELL DEPTH (ft btoc) 67.9

WATER COLUMN (feet) 40.4 TUBING DIAMETER (in) 3/8 SAMPLER'S SIGNATURE

PUMP & TUBING (V) (L) 0.98 5 V (L) 4.90

Time	Activity	Water Level (ft btoc)	Temp (Deg. C)	EC (µmhos/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (mg/L)	ORP (mV)	Color	Volume Purged (L)	Pump & Tubing Volumes Purged	Flow Rate (LPM)
1305	Arrived at well											
1310	Begin Purge											0.25
1314		28.01	18.91	7490	7.53	8.01	0.93	-68.9	clear	1.0	1.02	
1318		28.11	18.99	7726	7.53	9.42	0.54	-82.4	clear	2.0	2.04	
1322		28.19	19.17	7852	7.51	10.1	0.38	-83.5	clear	3.0	3.06	
1326		28.20	19.21	7919	7.46	8.93	0.32	-94.2	clear	4.0	4.08	
1330		28.20	19.28	7959	7.42	6.55	0.30	-98.3	clear	5.0	5.10	
1331	END PURGE											
1335	SAMPLE											
1340	Vacated well											

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Fe+2 (ppm) — Taken immediately before sampling.

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 28.20 FILTER LOT # A10425464

Comments:

PARAMETERS FOR WATER QUALITY STABILIZATION

Temperature ±1 C (1.8 F)	Conductivity ±5%
pH ±0.1	Turbidity 5 NTUs

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be periodically monitored during purging and sampling activities.

TETRA TECH, INC.
4213 State Street, STE 100
Santa Barbara, CA 93110
Telephone (805) 681-3100
Telefax (805) 681-3108

GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

DATE 02/06/06 SITE NUMBER 2

PROGRAM NAME BGMP TRIP BLANK I.D. V2TB1171

MONITORING WELL IDENTIFICATION OS - MW-1

SAMPLE I.D. VOSMW1 DUPLICATE I.D. / COLLECTION TIME -/-

STATIC WATER LEVEL (ft btoc) 25.11 TOTAL WELL DEPTH (ft btoc) 48.7

WATER COLUMN (feet) 23.6 TUBING DIAMETER (in) 3/8

PUMP & TUBING (V) (L) 0.79 5 V (L) 3.95

PURGING DEVICE MICROPURGE DEDICATED PUMP

SAMPLING DEVICE MICROPURGE DEDICATED PUMP

PID READING IN CASING (ppm) (initial) 11.7 (vented to) ~~10.6~~ ND PC

PID READING IN BREATHING ZONE (ppm) (initial) 0.0 (vented to) 0.0

SAMPLER'S SIGNATURE [signature]

Time	Activity	Water Level (ft btoc)	Temp (Deg. C)	EC (µmhos/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (mg/L)	ORP (mV)	Color	Volume Purged (L)	Pump & Tubing Volumes Purged	Flow Rate (LPM)
1210	Arrived at well											
1221	Begin Purge											0.30
1224		25.46	19.47	9469	5.88	26.5	2.99	33.9	hazy	0.90	1.14	
1227		25.54	19.40	8914	5.66	17.0	2.07	38.2	hazy	1.80	2.28	
1230		25.55	19.47	8812	5.63	14.7	1.67	39.6	clear	2.70	3.41	
1233		25.65	19.51	8774	5.61	13.1	1.33	44.4	clear	3.60	4.55	
1236		26.18	19.19	7760	5.84	12.8	0.35	34.0	clear	4.50	5.69	
1237	END PURGE											
1240	SAMPLE											
1255	Vacated well											

Fe+2 (ppm) — Taken immediately before sampling.

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 26.86 FILTER LOT # A10425464

Comments:

PARAMETERS FOR WATER QUALITY STABILIZATION

Temperature ±1 C (1.8 F)	Conductivity ±5%
pH ±0.1	Turbidity 5 NTUs

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be periodically monitored during purging and sampling activities.

Form number Tt-O-049 (9/05)

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TETRA TECH, INC.
4213 State Street, STE 100
Santa Barbara, CA 93110
Telephone (805) 681-3100
Telefax (805) 681-3108

GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

DATE 02/06/06 SITE NUMBER 2 PURGING DEVICE MICROPURGE DEDICATED PUMP

PROGRAM NAME BGMP TRIP BLANK I.D. V2TB 1171 SAMPLING DEVICE MICROPURGE DEDICATED PUMP

MONITORING WELL IDENTIFICATION OS-MW-2 PID READING IN CASING (ppm) (initial) 0.0 (vented to) 0.0

SAMPLE I.D. V05MW2 DUPLICATE I.D. / COLLECTION TIME V99W604 / 1700 PID READING IN BREATHING ZONE (ppm) (initial) 0.0 (vented to) 0.0

STATIC WATER LEVEL (ft btoc) 20.76 TOTAL WELL DEPTH (ft btoc) 45.7

WATER COLUMN (feet) 24.9 TUBING DIAMETER (in) 3/8 SAMPLER'S SIGNATURE [signature]

PUMP & TUBING (V) (L) 0.76 5 V (L) 3.80

Time	Activity	Water Level (ft btoc)	Temp (Deg. C)	EC (µmhos/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (mg/L)	ORP (mV)	Color	Volume Purged (L)	Pump & Tubing Volumes Purged	Flow Rate (LPM)
1340	Arrived at well											
1358	Begin Purge											0.32
1401		21.03	19.20	1244	7.03	5.74	0.29	-186.4	Yellow/clear	0.96	1.26	
1404		21.03	19.10	1105	7.02	4.92	0.21	-189.2	Yellow/clear	1.92	2.52	
1407		21.03	19.22	933	7.05	4.91	0.15	-192.2	Yellow/clear	2.88	3.78	
1410		21.03	19.22	841	7.08	4.75	0.13	-195.6	Yellow/clear	3.84	5.04	
1418	END PURGE											
1420	SAMPLE											
1435	Vacated well											

Fe+2 (ppm) — Taken immediately before sampling.

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 20.76 FILTER LOT # A1042546Y

Comments:

PARAMETERS FOR WATER QUALITY STABILIZATION

Temperature ±1 C (1.8 F)	Conductivity ±5%
pH ±0.1	Turbidity 5 NTUs

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be periodically monitored during purging and sampling activities.

APPENDIX B CHAIN-OF-CUSTODY RECORDS

TETRA TECH, INC.
4213 State Street, Suite 100
Santa Barbara, CA 93110
Phone (805) 681-3100
FAX (805) 681-3108

SHIPPED TO: EMAX Labs
1835 West 205th Street
Torrance, CA 90501

06B047

CHAIN OF CUSTODY RECORD

SITE 2 DATE 02/06/06 PAGE 1 OF 3

CLIENT: Vandenberg, AFB
PROJECT NAME: BGMP
PROJECT MANAGER: Kevin McNamara
TC#: T99105-06
SAMPLERS (Signatures)
X
X

TURN-AROUND TIME: Standard

OBSERVATIONS/COMMENTS: no Hg for Site 2

	SAMPLE NO.	DATE	TIME	SW8260 Volatile Organics	SW8015 ~~Diesel~~ Gasoline	SW8081 Pesticides	SW8082 PCBs	SW8270 SVOCs	SW8270 SIM PAHs	SW6010 ~~7470 / 7471~~ Metals	E218.6 Chromium VI	E300/310.1/160.1 CL/S/ALK/TDS	E353.3/E415.1 N / TOC	RSK 175	E376.2 Sulfide	E314.0 Perchlorate	Matrix Type	Container Type	Number of Containers	Filtered Sample	
1	V2TB1171	02/06/06	0800	X													W	G	2		
2	V2MW1		1525					X										G	2		
3	V2MW1F		1530							X								P	1	X	
4	V2MW3		1020	X				X										G	2		no VOCs for V2MW3
5	V2MW3F		1025							X								P	1	X	
6	V2MW10F		1150							X								P	1	X	
7	V2MW11F		1615							X								P	1	X	
8	V2MW12F		1335							X								P	1	X	
9	~~V2MW~~ V05MW1		1240	X	X			X										G	8		
10	V05MW1F		1245							X								P	1	X	

MATRIX TYPE: S = Soil, W = Water, SD = Sediment
CONTAINER TYPE: E = Encore; G = Glass, SS = Stainless Steel, P = Plastic
PRESERVATIVES: All samples are preserved at 4° C. Water samples are preserved as indicated on the sample labels.
TEMPERATURE BLANK EACH COOLER: (YES) NO

RELINQUISHED BY: Joachim Eberhardt	SIGNATURE:	TETRA TECH, INC.	DATE: 2/7/06	TIME: 1100	TOTAL NUMBER OF CONTAINERS ~~23/93~~ 20/90
RECEIVED BY: ALFREDO GALICIA	SIGNATURE:	COMPANY: EMAX	DATE: 2/7/06	TIME: 1100	METHOD OF SHIPMENT
RELINQUISHED BY: ALFREDO GALICIA	SIGNATURE:	COMPANY: EMAX	DATE: 2/7/06	TIME: 13:13	SPECIAL SHIPMENT/HANDLING/STORAGE REQUIREMENTS:
RECEIVED BY: ANTHONY FLORENDO	SIGNATURE:	COMPANY: EMAX	DATE: 2/7/06	TIME: 13:13	

2001

② T-3.0 ③ T-2.6°C
② T-2.8

DISTRIBUTION: White = Lab Canary = Client Pink = Tetra Tech, Inc.

TETRA TECH, INC.
4213 State Street, Suite 100
Santa Barbara, CA 93110
Phone (805) 681-3100
FAX (805) 681-3108

SHIPPED TO: EMAX Labs
1835 West 205th Street
Torrance, CA 90501

OGB047

CHAIN OF CUSTODY RECORD

SITE 2 DATE 02/06/06 PAGE 2 OF 3

CLIENT: Vandenberg, AFB
PROJECT NAME: BGMP
PROJECT MANAGER: Kevin McNamara
TC#: T99105-06
SAMPLERS (Signatures)
X
X

TURN-AROUND TIME: Standard

OBSERVATIONS/COMMENTS: no Hg for Site 2

	SAMPLE NO.	DATE	TIME	SW8260 Volatile Organics	SW8015 Diesel / Gasoline	SW8081 Pesticides	SW8082 PCBs	SW8270 SVOCs	SW8270 SIM PAHs	SW6010 / 7470 / 7471 Metals	E218.6 Chromium VI	E300/310.1/160.1 CL/S/ALK/TDS	E353.3/E415.1 N / TOC	RSK 175	E376.2 Sulfide	E314.0 Perchlorate	Matrix Type	Container Type	Number of Containers	Filtered Sample
11	V05MW2	02/06/06	1420	X	X			X	X								W	G	9	
12	V05MW2F		1425							X								P	1	X
13	V99W603		1710					X										G	2	
14	V99W603F		1715							X								P	1	X
15	V99W604		1700	X	X			X	X									G	9	
16	V99W604F		1705							X								P	1	X
17	V2MW5		1235					X										G	2	
18	V2MW5F		1240							X								P	1	X
19	V2MW7		1445	X	X			X										G	8	
20	V2MW7F		1450							X								P	1	X

MATRIX TYPE: S = Soil, W = Water, SD = Sediment
CONTAINER TYPE: G = Glass, SS = Stainless Steel, P = Plastic, E = Encore
PRESERVATIVES: All samples are preserved at 4° C. Water samples are preserved as indicated on the sample labels.
TEMPERATURE BLANK EACH COOLER: YES / NO

RELINQUISHED BY: Joachim Eberlein	SIGNATURE:	TETRA TECH, INC.	DATE: 2/7/06	TIME: 1100	TOTAL NUMBER OF CONTAINERS: 35/90
RECEIVED BY: ALFREDO GALICIA	SIGNATURE:	COMPANY: EMAX	DATE: 2/7/06	TIME: 11:00	METHOD OF SHIPMENT
RELINQUISHED BY: ALFREDO GALICIA	SIGNATURE:	COMPANY: EMAX	DATE: 2/7/06	TIME: 13:13	SPECIAL SHIPMENT/HANDLING/STORAGE REQUIREMENTS:
RECEIVED BY: ANTHONY FIGUEROA	SIGNATURE:	COMPANY: EMAX	DATE: 2/7/06	TIME: 13:13	

5800

Tt-IRP-009 (04/26/05)

DISTRIBUTION: White = Lab Canary = Client Pink = Tetra Tech, Inc.

TETRA TECH, INC.
4213 State Street, Suite 100
Santa Barbara, CA 93110
Phone (805) 681-3100
FAX (805) 681-3108

SHIPPED TO: EMAX Labs
1835 West 205th Street
Torrance, CA 90501

OGB047

CHAIN OF CUSTODY RECORD

SITE 2 DATE 02/06/06 PAGE 3 OF 3

CLIENT: Vandenberg, AFB
PROJECT NAME: BGMP
PROJECT MANAGER: Kevin McNamara
TC#: T99105-06
SAMPLERS (Signatures)
X
X

TURN-AROUND TIME: Standard

OBSERVATIONS/COMMENTS: no Hg for Site 2

	SAMPLE NO.	DATE	TIME	SW8260 Volatile Organics	SW8015 ~~Diesel~~ / Gasoline	SW8081 Pesticides	SW8082 PCBs	SW8270 SVOCs	SW8270 SIM PAHs	SW6010 / ~~7470 / 7471~~ Metals	E218.6 Chromium VI	E300/310.1/160.1 CL/S/ALK/TDS	E353.3/E415.1 N / TOC	RSK 175	E376.2 Sulfide	E314.0 Perchlorate	Matrix Type	Container Type	Number of Containers	Filtered Sample	
21	V2MW8M	02/06/06	1525	X	X			X	X								W	G	25		MS/MSD
22	V2MW8F	↓	1530							X							↓	P	1	X	
23	V2MW9		1345	X	X			X										G	8		
24	V2MW9F	↓	1350							X							↓	P	1	X	

MATRIX TYPE: S = Soil, W = Water, SD = Sediment
CONTAINER TYPE: E = Encore; G = Glass, SS = Stainless Steel, P = Plastic
PRESERVATIVES: All samples are preserved at 4° C. Water samples are preserved as indicated on the sample labels.
TEMPERATURE BLANK EACH COOLER: (YES) NO

RELINQUISHED BY: Douglas Etchebarne	SIGNATURE:	TETRA TECH, INC.	DATE: 2/7/06	TIME: 1100	TOTAL NUMBER OF CONTAINERS: 35/90
RECEIVED BY: ALFREDO GALICIA	SIGNATURE:	COMPANY: EMAX	DATE: 2/7/06	TIME: 1160	METHOD OF SHIPMENT
RELINQUISHED BY: ALFREDO GALICIA	SIGNATURE:	COMPANY: EMAX	DATE: 2/7/06	TIME: 13:13	SPECIAL SHIPMENT/HANDLING/STORAGE REQUIREMENTS:
RECEIVED BY: ANTHONY FUSTERO	SIGNATURE:	COMPANY: EMAX	DATE: 2/7/06	TIME: 13:13	

1001

DISTRIBUTION: White = Lab Canary = Client Pink = Tetra Tech, Inc.

APPENDIX C SUPPORTING TABLES AND HYDROGRAPH

Table C-1
Summary of SVOCs and PAHs
EPA Methods SW8270C and
SW8270C SIM (µg/L)
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

Indeno(1,2,3-cd)pyrene (by SW8270C)											
	Fall-00	**Win-01**	**Spr-01**	**Sum-01**	**Fall-01**	**Win-02**	**Spr-02**	**Sum-02**	**Fall-02**	**Win-03**	**Spr-03**
2-MW-1	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-3	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA
2-MW-5	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-6	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA
2-MW-7	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-MW-9	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-10	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA
2-MW-11	NA	NA	ND	ND	ND	ND	ND	NA	NA	NA	NA
2-MW-12	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA
OS-MW-1	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
OS-MW-2	NA	NA	ND	ND	ND	ND	NA	ND	NA	ND	NA

	Sum-03	**Fall-03**	**Win-04**	**Spr-04**	**Sum-04**	**Fall-04**	**Win-05**	**Spr-05**	**Sum-05**	**Fall-05**	**Win-06**
2-MW-1	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-3	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-5	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-7	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-MW-9	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
OS-MW-1	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
OS-MW-2	ND	NA	4.27	NA	ND	NA	ND	NA	ND	NA	ND

Table C-1
Summary of SVOCs and PAHs
EPA Methods SW8270C and
SW8270C SIM (µg/L)
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

2-Methylnaphthalene (by SW8270C)

	Fall-00	Win-01	Spr-01	Sum-01	Fall-01	Win-02	Spr-02	Sum-02	Fall-02	Win-03	Spr-03
2-MW-1	NA	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-3	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA
2-MW-5	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-6	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA
2-MW-7	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-8	ND	ND	ND	6.3	5.7	23	ND	21	ND	28	21.3
2-MW-9	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-10	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA
2-MW-11	NA	NA	ND	ND	ND	ND	ND	NA	NA	NA	NA
2-MW-12	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA
OS-MW-1	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
OS-MW-2	NA	NA	ND	ND	ND	ND	NA	ND	NA	ND	NA

	Sum-03	Fall-03	Win-04	Spr-04	Sum-04	Fall-04	Win-05	Spr-05	Sum-05	Fall-05	Win-06
2-MW-1	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-3	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-5	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-7	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-8	25.1	32.0	38.2	9.5	9.7	25	21	25	18	13	27
2-MW-9	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
OS-MW-1	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
OS-MW-2	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND

Table C-1
Summary of SVOCs and PAHs
EPA Methods SW8270C and
SW8270C SIM (µg/L)
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

	Naphthalene [a] (by SW8270C)										
	Fall-00	**Win-01**	**Spr-01**	**Sum-01**	**Fall-01**	**Win-02**	**Spr-02**	**Sum-02**	**Fall-02**	**Win-03**	**Spr-03**
2-MW-1	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-3	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA
2-MW-5	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-6	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA
2-MW-7	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-8	ND	ND	NA	5.3	ND	21	10	18	12	16	15.2
2-MW-9	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
2-MW-10	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA
2-MW-11	NA	NA	ND	ND	ND	ND	ND	NA	NA	NA	NA
2-MW-12	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA
OS-MW-1	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA
OS-MW-2	NA	NA	ND	ND	ND	ND	NA	ND	NA	ND	NA

	Sum-03	**Fall-03**	**Win-04**	**Spr-04**	**Sum-04**	**Fall-04**	**Win-05**	**Spr-05**	**Sum-05**	**Fall-05**	**Win-06**
2-MW-1	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-3	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-5	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-7	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-8	18.5	25.7	28.8	9.7	9.2	21	17	22	16	12	23
2-MW-9	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
OS-MW-1	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
OS-MW-2	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND

Table C-1
Summary of SVOCs and PAHs
EPA Methods SW8270C and
SW8270C SIM (µg/L)
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

	Naphthalene [a] (by SW8270C SIM)					
	Fall-04	**Win-05**	**Spr-05**	**Sum-05**	**Fall-05**	**Win-06**
2-MW-8	14	15	18	11	10	21
OS-MW-2	ND	ND	NA	ND	NA	ND

	Indeno(1,2,3-cd)pyrene (by SW8270C SIM)					
	Fall-04	**Win-05**	**Spr-05**	**Sum-05**	**Fall-05**	**Win-06**
2-MW-8	ND	0.27	ND	ND	ND	ND
OS-MW-2	ND	ND	NA	ND	NA	ND

Definition(s):

µg/L - micrograms per liter
NA - not analyzed
ND - not detected; result is less than the method detection limit

Note(s):

a - The California Department of Health Services (DHS) notification level for naphthalene is 17 µg/L.

Table C-2
Comparison of Naphthalene Concentrations
EPA Methods SW8270C and SW8270C SIM (µg/L)
Wells 2-MW-8 and OS-MW-2
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

			Naphthalene [a]										
	Analysis	**Method**	**Sum-03**	**Fall-03**	**Win-04**	**Spr-04**	**Sum-04**	**Fall-04**	**Win-05**	**Spr-05**	**Sum-05**	**Fall-05**	**Win-06**
2-MW-8	**SVOCs**	**SW8270C**	18.5	25.7	28.8	9.7	9.2	21	17	22	16	12	23
2-MW-8	**PAHs**	**SW8270C SIM**	NA	NA	NA	NA	NA	14	15	18	11	10	21
OS-MW-2	**SVOCs**	**SW8270C**	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
OS-MW-2	**PAHs**	**SW8270C SIM**	NA	NA	NA	NA	NA	ND	ND	NA	ND	NA	ND

Definition(s):

µg/L - micrograms per liter
NA - not analyzed
ND - Not detected; result is less than the method detection limit.

Note(s):

a - The California Department of Health Services notification level for naphthalene is 17 µg/L.

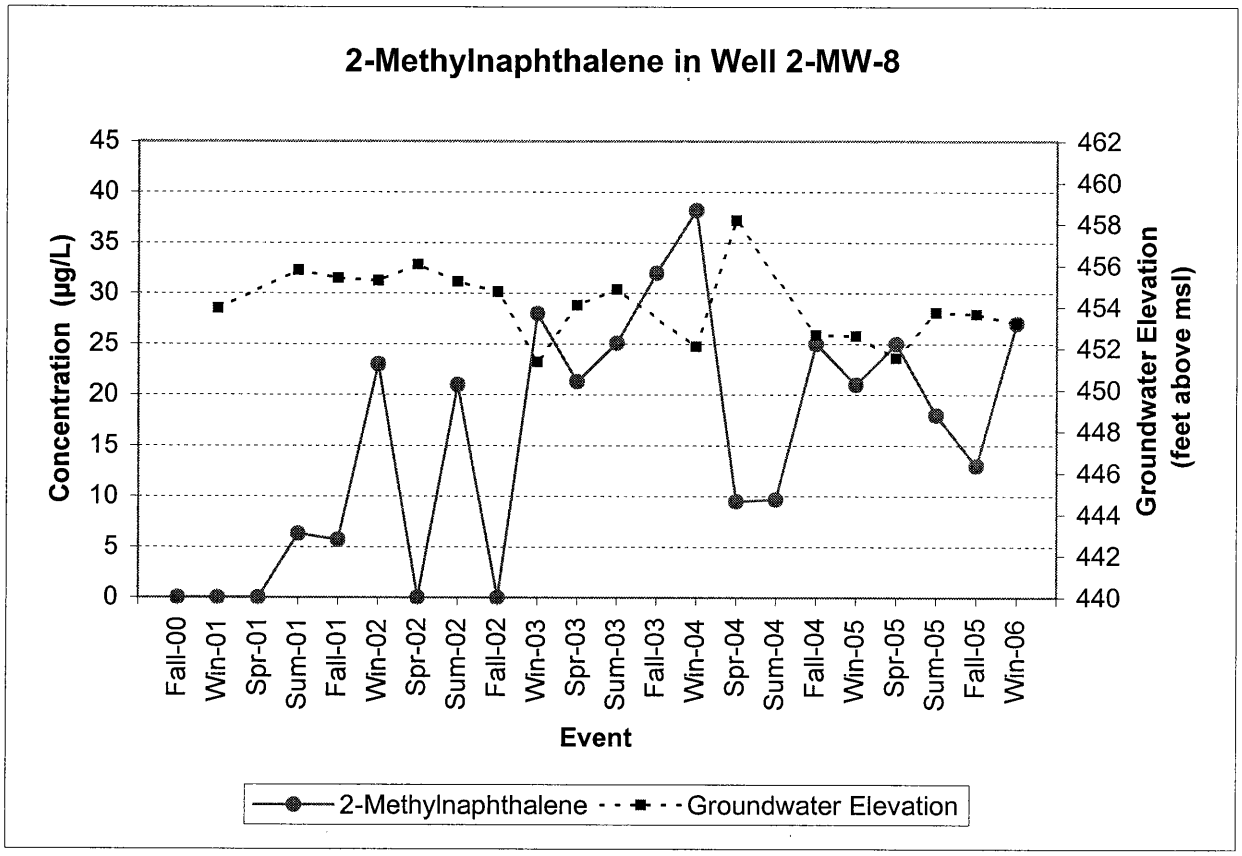

Figure C-1. Historic Concentrations of 2-Methylnaphthalene in Groundwater from Well 2-MW-8. The compound has only been detected in groundwater from well 2-MW-8.